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A RECORD & REVIEW *of* CURRENT THOUGHT AND ACTION

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THE HOLLAND HOME OF THE PILGRIM FATHERS

A VISIT TO THE HISTORIC SCENES CONNECTED WITH THE EARLY COLONISTS OF AMERICA.

WRITTEN ESPECIALLY FOR OUR DAY BY EDWARD PAGE GASTON

ST. PETER'S CHURCH, THE BURIAL PLACE OF JOHN ROBINSON

OLD BURG BESIEGED BY THE SPAINARD

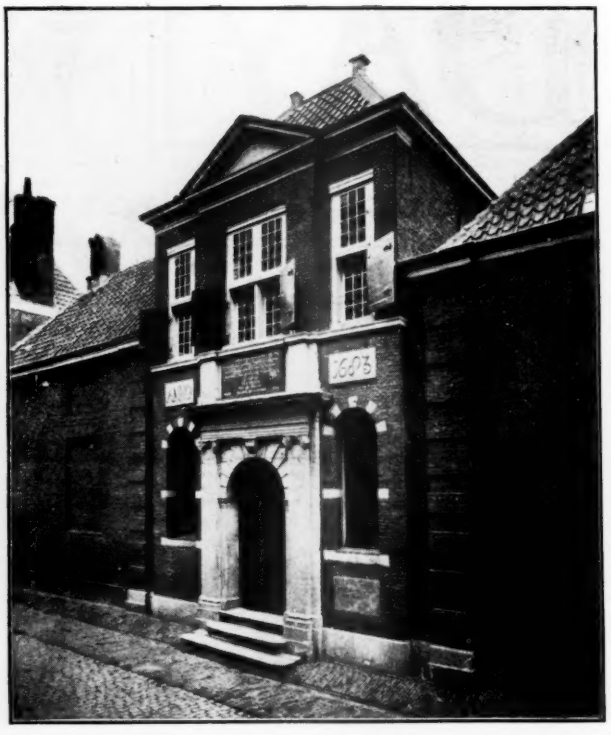
ONE OF THE LEYDEN CITY GATES

WHEN the cows come home at Scrooby, on the River Idle, they turn into their stalls in a quaint and curious old stable, whose roof-supporting beams, if looked at closely by the dim light coming in at the barred windows and at the rents which time has made in the ancient walls, are found to be richly carved. Few strangers will happen into this quiet corner of Nottinghamshire, and the most of those who go that way will miss the story of the place, where it may be said that American Liberty was given its birth in a manger. Nearby are the ruins of one of those Archiepiscopal Palaces of the old days, so common all about England, and this cattle-shelter you will be told by the simple old people who pasture their stock about the greens, was once a part of it; but the recollection of the most of the residents regarding the long-gone occupants is a hazy one.

Yet there the church of the "Puritans," as its members were sneeringly called for their upright lives, was born in 1604, an event which was to mean much for America and for the world; and it was in this dim little chamber, as also three miles away at Austerfield in a cellar, (as in the Catacombs at Rome), that the early fathers gathered in secret many times to talk and pray for that liberty in worship which was denied them in the fierce days of Queen Elizabeth. They were humble farmer-folk for the most part, but their quiet practice of religion brought down upon them so many persecutions that the chronicles of the time, as written by William Bradford, afterwards Governor and historian of the Plymouth Plantation in America, record how "at Scrooby some were taken and clapped in prison, others had their houses beset and watched night and day, and hardly escaped their tormentors' hands. Ye most were faine to flie and leave their howses and habitations and the means of their livelihood; so that being thus molested and seeing no hope of their continuance there by a joynte consente they resolved to goe into ye Low Countries, wher they heard was freedom of Religion for all men." They took the vow, "to walk in His way, whatever it should cost them."

"BEFORE AND AFTER EXAMINATION."
Caricature by students in the Leyden University

In endeavoring to make their escape to Holland, John Robinson and others of the leaders were arrested and imprisoned at Boston, one of the strangest old market towns now to be found in England, and from which such large numbers of American colonists came in later years with John Winthrop, that the name of the chief town of the Massachusetts region was ordered changed in their honor from Trimountain to Boston, and Amsterdam the place they selected. There a settlement was made in a quiet corner of that busy Dutch metropolis, and one who knows the way up and down its water-streets can still locate their meeting place, now used as a crowded tenement in the Brownistengang, an obscure alley way of but eight feet in width. Amsterdam had been chosen by reason of the opportunity which a large city offered to the immigrants in the way of employment, and because of the warm welcome by the Dutch people which was promised



HOME OF THE PILGRIMS IN LEYDEN

the Pilgrims before their coming. Holland knew what it was to suffer for the Faith, and it had not forgotten the hundred thousand martyrs who had lately been the victims of the Spanish Inquisition of the Dutch. So its territory was an open one to all the liberty-wishing peoples of the world.

The Puritans were not there alone as religious refugees, for twelve thousand of their English countrymen sought an asylum in Holland for a like cause in the space of sixty years, planting English worshipping churches in twenty-three places, some of the societies continuing in existence to the present time. Among the early ministers of these Separatist churches whose memory is still green, was Francis Johnson, described as "a single young man, and very studious, who lived on ninepence a week and subsisted on boiled roots." When the writer was in Amsterdam during the Coronation of Queen Wilhelmina, a visit was made to one of these churches founded in 1574, and another more youthful one had just passed its two-hundredth birthday, both still retaining a good membership.

The Dutch soon discovered that the Pilgrims, or "Ketters" as called in the Dutch tongue, were desirable citizens, and showed them many kindnesses. But the watchful John Robinson did not find matters just to his liking there. Unusual temptations to worldliness came to his people in that wealthy city, and the liberty of speech engendered such discussions among the various dissenting sects there settled that the peculiar Puritan beliefs were in danger of being lost by contact with other Separatists. In looking about for a new home various places were considered. It is said some of the Puritans favored Haarlem, a few leagues from Amsterdam, where the rich polder land offered natural attractions to the farming tastes of many of the Colonists. All the world had gone in a craze over the Haarlem tulips and bulbs in the century before, and some of the immigrants believed they could do well by locating there, as the raising of flowering bulbs continued to be a good industry, and even now pays two to three times the profits which other kinds of soil cultivation return. But conditions did not seem to be favorable to making a location in Haarlem, and Leyden was finally agreed upon, largely by invitation of the burgomasters of that place. Thither they removed in the year 1609.

Leyden at that time had a population of one hundred thousand, and rivalled London in size and commercial activity, being the center for large weaving and other trades. It also held the University of Leyden, then one of the most famous seats of learning in Europe, and which still enrolls hundreds of students. The old activities of the town have now largely gone, for when I strolled through its quiet streets, the census had declined to forty thousand, and the ancient industries had largely died away.

It required a deal of questioning and hunting about before I could locate the dwelling place of the Pilgrims, or find anyone who could tell me about them. By the aid of a friendly Hollander, I finally came upon the house in the Kloksteeg where Robinson had lived, and read above the door an inscription in antique Dutch informing me that "Here do you see a house builded through man and wife for strangers, expelled from their country and here accepted. Builded through Jean Pesyn and his wife, Marie de Lannoy." The house is not just as the Pilgrims left it, but was remodeled in 1683, being now in excellent preservation, and showing much of the original walls and many of the old beams with tool marks from the hewing and sawing of the Pilgrim builders.

The Government offered to each Evangelical church society locating in Holland a free place for worship, and tendered payment of its minister's salary out of the public treasury, a vestige of this old practice being still seen in the present payment of sixty guilders a year by the Government to all the churches in the country. The Pilgrims were firm believers in the separation of church and state, and so declined this proffer when it was made them, although it would have been of great assistance. They had a little money, and the men cheerfully set to work at their trades to add enough more to the general fund that land might be bought and church and residence buildings erected. By a common industry and frugality the sum of eight thousand guilders, the present equivalent to thirty-two hundred dollars, was held in the treasury at the end of two years. With this a lot was purchased just across from the old Church of St. Peter, built in the year 1112, and there a comfortable dwelling was made for the pastor, with twenty-one smaller houses adjoining for the remainder of the little Colony. A memorial tablet has been placed on the outer wall of St. Peter's church by the National Council of the Congregational churches of the United States to mark the site of these dwellings opposite.

The houses faced upon a small garden, reached by means of a common front entrance by a hallway leading through the Robinson house, and when I raised the rusted iron knocker on the door, a pleasant-faced Dutch woman led me out among the English holly-shrubs and the neat beds of roses, geraniums, heliotropes and ferns, where the quiet house doors looked forth. No regular church building was erected, for the laws of the time forbade that new edifices of strange and unusual faith should be put up with a church front, and so all of the independent churches of that day had ordinary house facings, except that the Pilgrims gave just a suggestion of the clerical style in their tower-like elevation over the street entry-way.

Pastor Robinson, they told me, lived in what is now number eleven in the pleasant garden-court, and the meeting-place of the little settlement was in his large living-room and schoolroom downstairs, which was sufficient to accommodate the small gatherings of worshippers, the Pilgrim community never numbering more than three hundred. I found a native artist living there, who was engaged upon a water color of the Robinson home interior, showing the fatherly head of this early religious family sitting at his study table, while his gentle consort moved about in her domestic duties.

"Come, wife, let us clear away the fare, and make ready for the friends, for they come to worship tonight," the pastor would often say, when supper was finished and the blessing of God had been implored over the simple meal. Then the table was pushed back, and the massive Bible took the place of its usual furniture. Chairs were arranged, and more benches brought in by the Pilgrims, if necessary, as they gathered after the work of the day. A hymn was sung, the Bible was read, and then John Robinson arose with a full heart and his cultivated and sympathetic face aglow, to tell of the guiding and keeping power of the Father, and to counsel with his beloved people, as he gave them earnest exhortation to lead lives befitting the Christed title of Puritans, as given them by a sin-following world. The kindly minister had a word for all, and it is still told in Leyden how the boys and girls leaned forward from the uncomfortable, backless benches to hear the words of the speaker, whom all loved and revered as a father. Sometimes there were visitors to these heart-to-heart services, for the excellent lives led by the Pilgrims drew about them a con-

siderable following of those who did not entirely accept their ascetic ways of life. Living as neighbors to the Colony was another and larger English church company numbering one hundred and thirty-five families, and many acts of kindly helpfulness were exchanged between the two peoples.

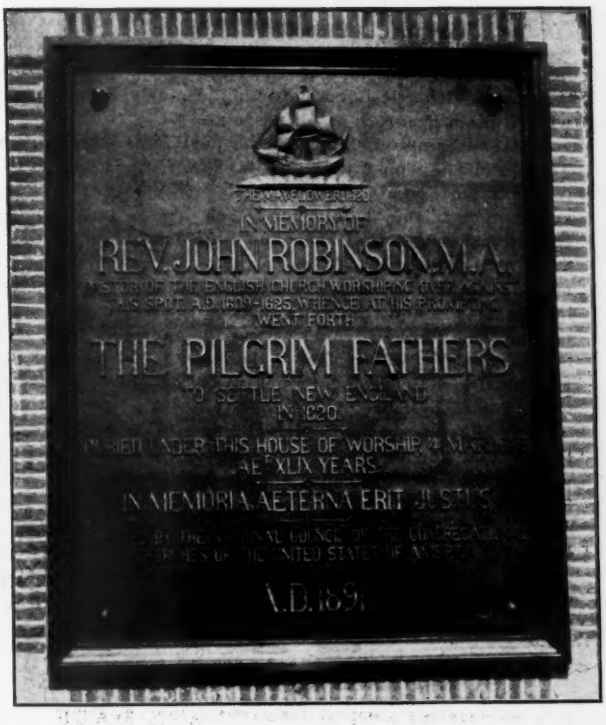
All was not in religious peace in Leyden, for the opposing believers in the Armenian and Calvinistic doctrines waged such war against one another that the streets on one occasion were barricaded by the entrenched Armenians. While the Puritans took no part in these disputes, they favored the Calvinists, and yet they had learned from the Dutch such tolerance as more and more softened the asperities of their Puritanism, and finally made of these sons of "three homes and civilizations" the liberal and sweetly reasonable Christians they were to become in America.

One attraction for the coming of the Pilgrims to Leyden was found in the advantage offered by the University, with the theological department, with which John Robinson and Elder Brewster connected themselves. This gave them many special privileges of citizenship, chief among which it appears was valued their monthly allowance of one hundred and twenty gallons of beer, with ten gallons of wine every three months, and in addition they had the excise privilege of brewing enough beer to supply their entire community. This now seems a strange item in connection with the privileges of theological students, but tea and coffee were then unknown, and home-brewed beer and domestic wines were the universal table beverages of the time.

The Pilgrim men worked at many of the trades of the day found in Leyden, and the tradesmen of the city presented them with a memorial for faithful service and honorable dealing when they were leaving for America. Boys and girls appear to have had a happy time in Leyden, and the Puritan lads in especial liked to play at war in the lofty fortifications of the old Burg, still standing in the center of the town, where only the century before six thousand of the Leydenese were besieged to the point of starvation by the Spaniards, relief only coming when William the Silent ordered the Dutch to cut the dikes and allow the sea to overwhelm their beautiful land. The Spaniards were drowned out and driven away, while the death-glazing eyes of the famishing watchers finally saw the fleet of flat-bottomed Dutch boats coming across the water-wasted country with food to raise the siege. When the lads grew older many of them entered the University, where Puritanic training evidently did not prevent their indulging in the college pranks common to all times. Some of the old caricatures they helped to make are still legible on the classroom walls, showing that the "sweat-box" of examination-day, and other college terrors were entirely appreciated nearly three centuries ago. On coming of age, some of the young men married with the fresh-faced Dutch girls round about, as the old town archives bear witness, and the Hollanders, in turn, showed a decided preference for the demure Puritan maids, numbers of whom left their quiet community to make homes of their own.

Life in Leyden went well; but it was going too smoothly, for the watchful Robinson and his counsellors foresaw danger unless still another change was made. The few Puritans and their singular beliefs were being diminished by the more numerous and liberal Dutch; the twelve years' peace-truce with Spain would soon be over, and their young men were fired with the war-spirit against the new invasion preparing in the South, and which the Netherlands were making ready to as sturdily resist. A proposal was made to a company of wealthy and sympathetic Amsterdam merchants to send the Colony to the New Netherlands in America, as offering the best place for the Puritan development, but the Government could not then spare the warships and soldiers necessary to protect the Colonists from being destroyed by the Spaniards as a nest of heretics. It was first proposed to settle near a point on Manhattan Island, which later became an obscure village called New York, in which case a Plymouth Rock might now be a feature of the present Greater New York, instead of the Massachusetts coast.

Turning to England for assistance, a union was finally formed with others of like faith there, and it was agreed to send two ships across the sea to found a New England with its larger liberties, where they were promised gifts of land and cattle. A loan of money was secured by the sale of stock in the Colonization Enterprise, at ten pounds a share, to some English merchants, but the money was advanced on such ruinous terms that the Pilgrims were compelled to forego their beer and butter, with other accustomed comforts, in making the sea-voyage. The Speedwell was secured in Holland, and the Mayflower in England, neither much larger than the blunt canal craft one now sees on the inland waterways of Holland.



MEMORIAL TABLETON ST. PETER'S CHURCH

John Robinson was not to go with his people whom he had led so well, but staid behind until a more convenient time for his departure, meanwhile to sustain the faith of those who remained. A day of humiliation and prayer was appointed for the departing Pilgrims, after which Pastor Robinson preached the farewell sermon, when it is recorded that "he spent a good part of the day very profitably and suitable to the present occasion." Robinson never saw America, but came to his death in 1625, and he sleeps under the pave of St. Peter's church, with "89" as the interment number to indicate the tomb of the one who may be truly called the forbear of American Freedom. A tablet has been placed in the church to his memory in late years, when the early history of the Pilgrims in Holland has only been definitely made known.

More than Dutch sympathy followed the Colonists and their fortunes to the Western wilds, and it is doubtful if the most of Americans even yet realize what the United States owes to Holland. Our Government is more Dutch than English in its laws and forms, and the red, white and blue of the American flag is a color parallel of the national emblem of the Netherlands. The Dutch first saluted the new flag when American Freedom was declared, and the States-General early recognized the Independence of the Colonies, paying the penalty by a war with England for this and other friendly acts to the new world insurgents. When the fortunes of the Continental Army were at their worst, the bankers of Amsterdam made a loan of fourteen millions of dollars, and half of the ammunition for Washington's army was delivered by Netherland ships. It was a fleet of grain-boats under a Dutch captain that broke the blockade of Baltimore and succored that hungered city, and the American Revolution in general was largely fashioned along the line of the Dutch revolts against Spain in 1579 and 1581.

Loading their few stores upon barges, the Pilgrim immigrants left Leyden on the twenty-first day of July, 1620, and worked down to where the Speedwell awaited them at Delftshaven. The modest church in which they held their farewell-service is still standing, and a giant hooded wind-mill awkwardly twirls its flapping arms at the point where they embarked. A Hollander will quietly smile nowadays when he is shown the painting in the Capitol at Washington representing the Pilgrims leaving from a rocky shore on their embarkation. There are no rocky shores in Holland.

Kneeling on the bank of the Maas River, the last prayer was said by John Robinson, whose parting from his people drenched every face in tears, as he commended them to God, and resigned his leadership to the scholarly Elder Brewster, with William Bradford as his associate.

At Southampton, England, the party was joined by John Alden and his company in the Mayflower, the two ships leaving that port on August twentieth. Stopping at Dartmouth and Plymouth, they boldly put to sea, but on reaching Land's End it was found that they had been tricked in getting the Speedwell, for she proved unseaworthy. Putting back to Plymouth, the pinnacle was abandoned, and the company, including passengers and crew, was reduced to one hundred and one persons, one-third of whom were boys and girls born in Holland. The party was typical of the later American stock, being English, Dutch Irish and French in its origin, and was afterwards joined by more of like ancestry.

The Mayflower finally left Plymouth on September sixteenth, and during a storm at sea was only saved from loss with all on board by repairs made with Delft iron bracings. For two months she fought the ocean storms across the ragged ranges of the deep, but on November nineteenth Cape Cod was sighted, a permanent landing being made on December twenty-first. On Christmas Day of 1620, houses begun building in the Massachusetts settlement, and the true germs of the mighty American Nation had been planted.

HOW GLASS MOSAICS ARE MADE

ONE of the important features of the new United States mint, at Philadelphia, is the decoration of the vestibule. This consists of a series of panels illustrating the art of coinage, executed in mosaic by the Tiffany Studios. These pictures are about five feet high, and fill in the wall spaces between the wainscoting and the pendentives, which support the vaultings. The idea of showing children engaged in the various processes of coinage was suggested by frescoes found at Pompeii.

Glass mosaic pictures set in a solid wall are not made by the same process as that which is employed in making glass windows. The pictures are made of much smaller pieces of glass. The cartoon of the mosaic must be reproduced in every line, as in the glass window. The tracing is made on transparent linen from a full size cartoon, either in color or carefully shaded black and white. The color scheme of the mosaic is determined by a small color sketch from which the glass is also chosen. This tracing is transferred by impression paper to a mounted board, which is the size of the mosaic panel, or in case of a very large piece of mosaic work, the mosaic is made in sections, each section being mounted on a separate board. The working drawing shows every line which will afterward appear in the mosaic, some of the spaces being only about a half inch square, and in a face or some difficult portion of the work there are many pieces much smaller. The drawing is then covered thinly with melted wax so that the lines underneath can be distinctly seen.

The mosaic worker has at his disposal a large supply of glass of many colors and degrees of thickness and density, and from these sheets every piece necessary for the picture must be cut. The pieces are cut with a diamond or steel glass cutter, and worked into the exact shape with iron pliers, and then fitted into the space allowed for them on the waxed surface of the working drawing. This process continues until the entire drawing is covered with the various pieces of glass, reproducing the cartoon in color. When the cutting of the glass is completed the whole work is laid flat and the surface of the glass is covered with varnish, which is allowed partly to dry. It is then covered with oiled paper pressed down until it adheres firmly to every part. The paper on which the glass has been worked is cut loose from the board, and the whole is laid face down on a marble table which has been covered with a preparation of Venetian turpentine. The original paper is now carefully removed, and the back of the glass, thus exposed, is thoroughly cleaned. Cement in a liquid state is now poured over it, so that it runs into every crack and crevice. In a few hours the cement is hard, and the panel is then loosened from the marble table, turned over and the oiled paper removed. The surface is then carefully cleaned, so that all foreign substances are removed from the face of the glass, and finally the finished panel is set in its permanent resting place, its material fragile, yet durable, and destined to withstand the disintegrating forces of nature and retain all its beauty of color and form as long as the structure of stone or marble which it decorates.

In the concern where the mint mosaics were made men and women are employed as designers and makers of glass mosaics. It is stated in the New York Tribune that among the works that have been turned out by these makers of mosaics are the large panels in the Alexandrian commencement hall at Princeton, illustrating Homer; a series of panels ninety feet long in the rotunda of the Marquette Building, Chicago, illustrating scenes in the life of Pere Marquette, and two panels, each thirty-two feet long, in the Wade mausoleum, Cleveland.

A LESSON IN IMMORTALITY

IDA H. DAVIS, a teacher in Boston, recently told the story in these words of how she taught her class the immortality of the soul: One day in the latter part of the winter I went to call on one of my boys, whose small sister lay with softly closed eyes and folded tiny hands, and the mother wailed loudly over the little bed. Six other children sat and lounged around the room. The little one looked so like a lily-bud that it was not fitting the other children should dread or be too familiar with the mystery of her calm.

A few weeks later another child died, another boy's sister, and before we had time to forget it, the way to teach them the beautiful view of death came into my mind or heart.

Some cocoons were given me by one of the gypsy moth men, and I took them into school and placed them in a box on the window-sill. Of course the boys were curious when they saw the box, and asked all the questions they could think of, most of which they had to answer for themselves. I gave them no regular lesson, but spoke always of the cocoon as a coffin, and the caterpillar inside as sleeping while his wings were growing. Seldom a day passed without a visitor to the box or a question as to when the butterfly would hatch.

One lovely June day the first boy who filed passed the box gave a cry that drew us all to his side. There on the edge of the box was a beautiful butterfly, feebly beating the air with his wings. "Ain't this his heaven, teacher?" he asked. "He ain't got used to his heaven yet," said another, who was watching the feeble motion of his wings. "He won't have to crawl any more, he's got wings; he can fly," said another, a boy to whom flying would be a special delight, judging from the continual restlessness of his arms and legs.

All the morning the boys kept watch of the butterfly, and when, with a free sweep of his wings, he rose in the air and disappeared out of the window. A small watcher forgot himself and cried out in alarm: "Oh! teacher, he'll get killed!" Instantly another boy sprang to his feet and catching my eye answered for me, "He won't care. He knows what heaven's like and he's satisfied."

CATTLE FROM A THOUSAND HILLS

CHICAGO as a distributing point for the product of millions of farms enjoys a world-wide reputation for its Union stock-yards. A. G. Leonard, the general manager, describes the extent of this business in these words, sums so large as to be difficult to comprehend. He says:

On an average a round million dollars' worth of live stock is sold at the Chicago stock-yards every day. The receipts and valuation of live stock at this market during the year just closed were:

Kind.	Number.	Valuation.
Cattle	2,729,046	$136,452,300
Calves	136,310	1,622,089
Hogs	8,109,064	96,092,408
Sheep	3,548,885	16,502,315
Horses	99,010	11,485,160

The above live stock was received in 277,205 cars, being an increase of about 8,000 cars over the previous year. During thirty-five years since its establishment this market has received 307,971,693 animals valued at the enormous sum of $5,508,750,310.

An average busy day's receipts consist of approximately 25,000 cattle, 40,000 hogs, 25,000 sheep, and 2,000 horses. The cattle would represent the enormous total of 18,000,000 pounds, or 9,000 tons of beef; the hogs would dress 3,600 tons of pork, and the sheep 575 tons of mutton, a grand total of 13,175 tons of dressed meats furnished to the world in a single day by this market.

ELI HOPKINS, FARMER

THE OPPORTUNITIES AND TEMPTATIONS OF POLITICAL LIFE AS PRESENTED TO A MAN OF UPRIGHT CHARACTER

WRITTEN ESPECIALLY FOR OUR DAY By FRANK H. SWEET

"YOU will run, of course?"

The tall, rather loosely-built young man standing by the fence shook his head. One hand was resting lightly upon the top rail, the other grasped the handle of a hoe—he was not leaning upon it. Five minutes before, he had been called from the potato field to listen to the most astounding, most flattering proposition which had ever come to his life; but instead of making him exultant, it only made him a little more grave.

"I am not competent," he answered, "the man you want should have a better education and a larger experience. I do not even know the leaders of the party, and but very few of the voters."

The man in the buggy raised his hands deprecatingly.

"You are the man we want," he insisted, suavely. "The voters have grown weary of professional politicians, and are now ready for one of their own number, whom they know and can trust. If I may be permitted to say it, you have a strong personality, which I have noticed even during our five-minutes' talk. This will count to our advantage. When your name was first mentioned, I demurred, as you were an obscure farmer, who, I thought, could have little influence with the popular vote. But a few stories I have heard, and this talk, have satisfied me that you are the right man. As one of the local papers has expressed it, the party has grown degenerate with oil, and now needs iron. You see I am candid. We do need a radical change in order to regain backsliders."

He waited a moment, but as the young man said nothing, went on:—

"Now please give this your unprejudiced consideration. You say that you are not a party man, and that you wish to be where the best service can be rendered. Well, our party is at rather a critical point and in need of a strong leader. We offer you the place. You understand what opportunities for work that means just now. And then there are the personal advantages," his voice growing softer. "You are a small farmer in a section where only meager results can be obtained by the severest application. This would be a direct leap to the very height of ambition. You would be envied by those who have looked down upon you. And usefulness—but, of course, you know what that would be to a strong man in power. Well," briskly, and gathering up his reins, "think it over and don't decide too hastily. I will see you again. You have done some good things, and people are beginning to find them out. They will be a strong card in the canvass. And, of course, they are but an indication of what will be done when you get to where you can make or influence the very law itself."

As his buggy rattled down the road he chuckled and shook the reins complacently.

"That fetched him," he thought. "I could see it by the very way his shoulders squared. Make the law! Good! It was an inspiration. The fellow would like to bring the millenium all by himself. But he'll make a good figurehead, and may pull us through. I wouldn't be a bit surprised. He's got a way that's likely to capture the reform vote in a bunch, and then the place will capture him. That's the way."

"The voters have grown weary of professional politician."

Again he chuckled and urged the horse forward, wincing a little as the wheels bounded and rattled over the loose stones.

"It does seem queer to put a fellow like Hopkins in front of us," his thoughts resumed; "a lamb to lead the wolves, or rather maybe a lion to take charge of the jackals—yes, that is better, lion and jackals; I like to be candid. But in this case the lamb will not be devoured; he will simply turn wolf, and the lion will change his skin for that of a jackal. That's the way. I've run with them and know. It isn't nice to see lions change, of course, but if they will, they will, and it's our only chance. Brayton and Jones and Rush have finished us along the old lines, and we've helped them to finish, and now we've got to slink out of sight or put on a square, honest front for people to look at and take off their hats to; and Hopkins must be that front. He's never been mixed with politics and has always lived in a half-settled country, and has a forceful, convincing way of putting his words. The people will be like weasels this time, and seek for motives. We must have a man who will bear investigation. That's the way. Our party has been growing a little unstable of late, and needs a new head. It's best to be candid. We'll hoist up Hopkins so all the people can see him, and then keep back in the shade ourselves. That's the way—Hello!"

Another buggy had rounded a bend in the road and stopped directly in front. In it were two men, both florid, both flashily dressed, and both apparently surprised at the meeting.

"Hello yourself, Jackson," one of them called. "What are you doing up here? Been to see Hopkins?"

"Of course, what else would bring me to this wilderness?"

The men exchanged uneasy glances.

"Make any deal?" suspiciously.

The man in the first buggy, whom they had called Jackson, laughed a little contemptuously.

"That's just like you, Casey and Bond, always suspicious, always trying to gain your ends by running blindly against a wall. Doubtless your idea would be to hunt up Hopkins and make some blunt proposition which would cause you to be kicked from his potato field. I was afraid of this when his name was brought up yesterday, and I saw you two whispering together. From what was said about him I knew that he was a man to be approached diplomatically. But look here, gentlemen," his voice changing suddenly and becoming conciliatory, "what's the use of bickering? We're in the same boat, and I can't afford to let you spill your fish when it's going to spill mine, too. You want backing for your contracts and your friends' contracts, and I'm deep in that railroad franchise. We must have a man in power who will be friendly."

"There's Brayton and Jones," said Casey, sullenly. "They'd have fixed anything for us, and not have made it come high, as this Hopkins is likely to."

"Brayton and Jones have gone by," retorted Jackson, a little impatiently. "Didn't the rest of us explain that yesterday? It would be a waste of money to back a man who hasn't the remotest chance of getting in. What we want first

is to make the party sure, and then try to work the man. And I'm free to tell you," ominously, "that the party's on a mighty shaky foundation just now, and only an A No. 1 man can run the gauntlet. That's straight. I've seen Hopkins, and I think he's the sort to catch the reform vote. And that is certainly our cue."

"You were keen to reach him first," muttered Bond, discontentedly. "I suppose the franchise is all arranged?"

Jackson touched his horse with the whip.

"I'll wait for you to get into a better temper," he said, shortly; "only I warn you not to go on to Hopkins in your present frame of mind. If you do, you will make a mess of the whole thing, and very likely have some of your bones broken. As to the franchise, it has not been mentioned; nor has any allusion been made to possible compensation for our services. It isn't time for that yet. I hurried out there merely to keep you bunglers from making trouble. Good day."

His buggy was nearly by when Casey threw out his hand frantically.

"Hold on, Jackson," he cried; "don't go off in a huff that way. We didn't mean anything, of course. It was only our way. We can't get along without you in these things. We understand that, and will not speak to Hopkins if you say so. There, that's right," with an expression of relief, as the buggy wheels went slower and came to a gradual stop a few yards away. "Now tell us straight what you think about this man. Can we work him after we get him fixed? Bond and I can handle fifty thousand, and double it if it is worth while, and I suppose your friends will do as much?"

"More, if necessary," briefly. "But in this case money's got to be kept in the background. We'll use it for building up, and for buying in as many supporters as we can. It's good policy to own the henchmen when there's liable to be a hitch. But it's all to be done on the quiet. Hopkins himself calls for different bait."

"Ambition to be dazzled?" suggested Casey.

"No, I didn't read him that way. The idea is moral obligation. We must make him realize how necessary he is to the cause, what opportunities for great work are awaiting him, and how few men there are who could accomplish it. In short, he is the man, and the work is a duty—always remember to speak of it to him as a duty."

"But can we work him?"

"If we do it right. We must get his mind fixed on the great opportunities, and he will stumble over such little holes as we dig, in order to reach them. That's the way. I've run with them and know. But it isn't nice to see a great opportunity man stumble into a little hole that is away down below his feet," this last in a regretful, half-musing tone. Then, more briskly, "Well, be careful what you do, that's all I have to say. Bank your money freely, but do it behind Hopkins' back. I shall leave him alone a few days to let this opportunity idea ferment, and then come in with a clincher of a few of his most esteemed farmer friends to urge him to the same duty. I will fix it with them in the meantime. Good-by.

His buggy shot away under the impetus of a sudden bringing down of the whip; and the other men, after a brief parley, turned their buggy and followed slowly, soon dropping out of sight. Jackson rode on for half a mile, looking critically from side to side, and passing several small houses. At length he came to what was evidently the home of a wealthy farmer, for the house was large and surrounded by towering elms, and stretching away in the background were broad, well-tilled fields. Jackson stopped here.

Half an hour later he came out, apparently well pleased with his visit. Two more calls were made at large houses, then he stopped at a vine-covered cottage in the midst of what was evidently a small fruit farm. Well laden trees were on either side of the lane which led up to the house, and among them were long rows of small vines and plants, some past their season, while others bent to the ground with green or ripening fruit. Behind the house could be seen the thrifty, wide-spreading branches of an apple orchard. Jackson gazed about appreciatively.

"This is what I should like," the restless, speculative look fading momentarily from his eyes; "vine and fig tree, and be the arbiter of one's own destiny. That would be worth while. What's a man hampered with ambition for, and with a chronic disregard for what he has and a longing for what he hasn't? Why can't he be satisfied with just happiness in the good old-fashioned way? Ho-hum!" with a half-sigh, which ended in a forced laugh; "we've civilized ourselves beyond that. It's the little ones to push up and the big ones to fall down. That's the way. But it isn't nice to see the big-idea lion listen to the small-idea jackal." He gave another appreciative, half-regretful glance around, and then sprang from his buggy opposite the entrance to the vine-covered cottage.

A young woman in dusting-cap was arranging some erratic tendrils, and as he paused at the foot of the steps he noticed how trim was her figure and how graceful her pose.

"Can I see the owner of the place a few minutes?" he began, adding quickly as she turned, "What, Alice, is it you?"

"It certainly is, Ned," a pleased ring of surprise in her voice; "but you are the last person I expected to see."

She was grasping his extended hand now and gazing frankly into his face.

"Yes, it's been a long time, Alice," he said, reflectively, "five or six years, isn't it?"

"Nine, and a little over. Our class graduated in June, and we said good-by on the rustic bridge back of the school-house in August. Don't you remember?"

Yes, he did remember, and when next he spoke his voice had an added softness. He could see the little bridge and almost hear the low exchange of ambitious plans for the future. And there had been the breaking of a coin, and an exchange of photographs and a promise of letters. As he gazed into her face now, remembering their school-day friendship, he felt amazed that none of the letters had been written. Perhaps they had both been too busy, or perhaps—with a sudden twinge of self-reproach—she had expected him to answer that little note she had written on the way to her school in the West, the address of which he had carelessly mislaid and lost.

"I see your name in the papers now and then, Ned," she said, as she drew a chair forward, and then seated herself in one opposite; "but it seems strange for you to be making a business of politics, when you had planned for something so different. It—doesn't seem quite the best thing you could do."

"No," meditatively, "perhaps not. But you know, Alice, some folks drift better than they root. I make a good jack. I mean jack-of-all-trades." Then, hastily, "But how happens it you are here? Didn't the West have the advantages you expected? Or—are you married?"

"No, I am not married," quietly, "and the West has plenty of advantages. I came back because my uncle needed me. He was alone, and getting too old to manage the place by himself. Now he thinks the work and responsibility are too much for me, and talks of selling. I shall be sorry to leave. I have been here two years and like the life very much."

"Yes, it is a modern Eden," Jackson said warmly. Then, "What does your uncle value the place at? I—I have a friend who might like to buy."

"Ten thousand, I believe, is his price. But please don't tell your friend," anxiously, "I don't want uncle to sell. He wouldn't be satisfied if he left here. But there he comes now," as an old man appeared from the orchard with a handful of grafts. "Oh, Uncle," she called, "here is a gentleman who wishes to see you."

It was an hour before Jackson rode away from this house, reluctantly. The old man knew Hopkins, and had readily promised his aid. But Jackson was not thinking of that now, but rather of the woman who had more than fulfilled the promise of her girlhood, and incidentally he was thinking of the ten thousand or so dollars of his own which he had intended to put into the campaign, but which he now felt might be more wisely invested. At intervals he berated himself for a simpleton, and immediately relapsed into the same simplicity, wondering if this woman would be willing to restore him to the old friendly footing they had maintained as girl and boy, and if—but much to his relief he found the other buggy waiting for him at the end of the lane, and the disturbing thought was put outside for the more familiar intricacies of guerilla politics.

Meanwhile Hopkins had gone back to his unfinished row of potatoes, not elated, as Jackson supposed, by the dazzling prospect spread before him, but weighing the idea carefully as he hoed from row to row, and finally dismissing it as untenable. And it did not recur to him until brought to the front the next forenoon by the most influential farmer in the neighborhood. This time Hopkins listened attentively, for he knew the man was

straightforward and unusually well read for a farmer, and that he only advised from his own honest conviction. And, when, during the forenoon, others of the better-known farmers, and among them the venerable fruit grower, came and assured him that he was the man who ought to represent them, he began to think that perhaps the suave talking stranger in the buggy had been right after all. But it was not until the end of another week, and after he had examined the matter from all questionable points of view, that he finally consented for his name to be used. After that he was ready to give to the work the same steadiness of purpose and untiring energy that he gave to everything he undertook.

He had done some good things, as Jackson had said, but he was too modest and too earnest to realize the fact himself. As a boy he had worked for his board, and then for a small pittance, increasing as he grew stronger and employers came to realize more fully his ability and trustiness. At length a high-salaried position had been offered him in a mine in the far West, but only on condition that he should sign a contract for a long term of years. This he had refused, because it would take him from the vicinity of schools and a possible education.

The education obtained—consisting of a term in a village academy and a year in an agricultural school, supplemented by such study as he could find time for out of work hours—he had saved money little by little and purchased a small farm, discovering only when too late to get his money back that there was a flaw in the title. But he had sought out the real owner and given up the property without demur, and then had gone back to the slow process of again saving up from the small farm wages which could be obtained. Later he had given much time to advocating better roads in the rural districts. He was not a fluent speaker, for his speech was deliberate and even slow; but every word was the carefully weighed convictions of a man who studied into the thing he talked about.

But for a time the canvass progressed slowly. Such matter-of-fact talk was not calculated to stir the masses, and only when the more thoughtful closed in solidly around him and gave their influence toward securing a rapidly widening circle, did the outlook seem promising. At length the farmer vote was unquestionably his, and then Jackson concluded it was time to speak. Hopkins had tasted of the fruits of victory, and would find it hard to retreat.

Casey and Bond were standing but a few yards away when he approached Hopkins and took his arm familiarly.

"The game is practically won, Hop," he said affably; "thanks to my hard work and your solid talk—oh, yes, and to Casey's and Bond's help, of course," nodding to them condescendingly. "We will have to let them in with us on the spoils."

Hopkins looked down at him gravely. Jackson was six feet in height, but Hopkins looked down at him.

"Yes, you have worked hard, Mr. Jackson," he said, "and your friends also—I appreciate it. If the game is won, as you term it, I will be glad to do what I can in return. There will be vacant offices, and so far as those who have assisted me are competent, I will give them preference. It will be the least I can do. I suppose that is what you refer to as spoils?"

"Yes, yes; that is it," complacently. "I am glad we understand each other so well. I did not anticipate any trouble, though Casey and Bond here thought there might be a little friction. However, we have all been glad to do what we could for you. It is not often that a man and an office are found so peculiarly fitted for each other. You must not think us altogether mercenary, Hop, and hungry for office. We do not wish any, I assure you, and should refuse if offered."

"Really?" Hopkins looked down at him with a surprise which was mostly pleasure. He had liked this man from the first, though mingled with the liking had been a mistrust which kept him watchful. "I am glad you care so much for my success, Mr. Jackson. I hope to make it up to you some way."

"That's all right, Hop," easily. "Your work for the public will be the best kind of reward. I am delighted to have been an instrument to help put such opportunities within your reach. Of course, in due time, there might be some little influence that would be of use to me, the signing of a paper or two—no trouble to you at all. All that is needed now is the mill vote, and I don't mind saying I have that in my own hands, and can use it as I will, and, as you know, it is large enough to turn the scale for or against us. So I feel that I can safely congratulate you in advance. The position will put great opportunities in your hands, Hop."

Hopkins' face became more thoughtful.

"I understand," he answered; "and sometimes I am almost afraid that I may not be equal to them. And yet it is for them that I want the office. Many things have crept into politics which ought to be done away with, and there are abuses and incompetencies in so many places that it seems an almost hopeless task for one man to attempt to right them. But I will do what I can. And I am glad to know that you will help me, and your friends here also. It will make me stronger to feel that I have such staunch supporters near. Lately, I have been looking into some of the privileges which large corporations have obtained in utter disregard of law or individuals' rights, and, though it may be too late to change many of them, there are some which may be mitigated and perhaps checked. In particular, there are two which I have been especially warned against: one is a patent butter, which, in evading the law, threatens the farmer, and the other is a railroad franchise. The first I understand and can meet; to thwart the second I shall rely on your assistance.

A peculiar expression had come to Jackson's face, he was looking straight ahead; Casey and Bond were chuckling.

"What is the franchise?" Jackson asked, after a moment's silence, "the A. T. W.?"

"Yes, you have heard of it?"

"I have been asked to help it," Jackson spoke quietly, flashing a keen look at the grave face above him. "You see, it is just this way, Hop; I have some little influence, and individuals as well as corporations have a habit of coming to me for advice and assistance. That mill vote I spoke of just now is quite a bait, and will generally turn the tide as I direct—though I admit that this year it is rather fickle. However, I believe that I can keep you from the office just as easily as I can put you into it. The A. T. W. know this, and have made very liberal advances. But of course from what you said just now there will be no friction. The A. T. W. are not a bad lot, and indeed will be able to help you wonderfully with your good work. They nod to me, I switch on the mill vote, you acknowledge the courtesy by a little kindly influence. That is all. Then we combine in a grand reform movement, which will sweep away the corruption which we all object to. In union there is strength, Hop; but divided, a man is pretty apt to fall."

Casey watched them beamingly; Bond began to clap his hands softly. Hopkins looked down at Jackson with a regretful expression in his eyes.

"Then you are against me," he said.

"No," quickly, "I would rather be with you."

"I am sorry," the grave voice went on, without heeding him. "I hoped that we could pull together in this. I like you, and in this work you could be of great assistance."

"You will fight the A. T. W.?"

"I must."

"Even to antagonizing the mill vote?"

"Of course. I wouldn't care for the place at such a price. But understand," a sudden ring coming into his voice, "I shall not withdraw so long as a single voter wishes me to remain. Now that I have entered the lists I will stay until forced out. It will be a fight to the end between us."

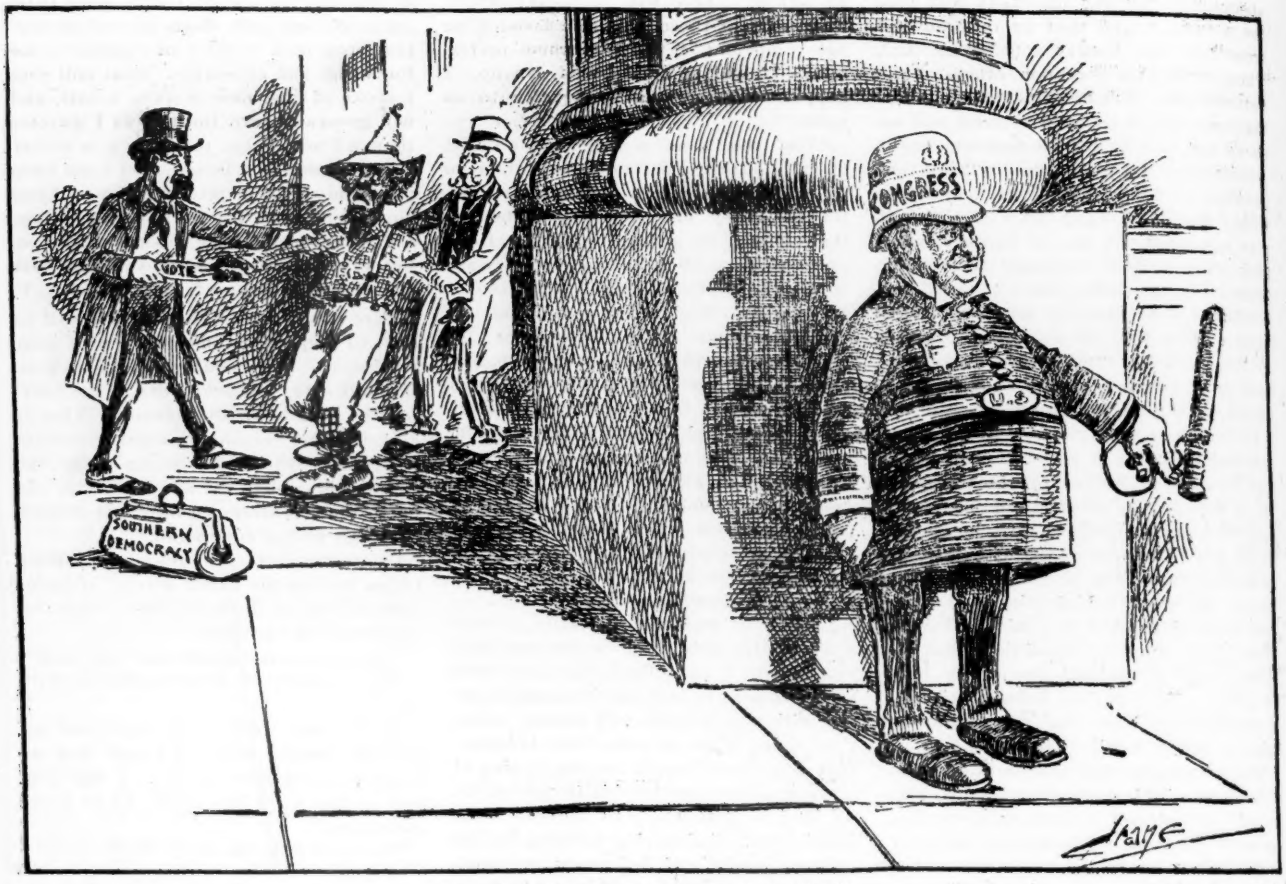
Jackson was again looking straight ahead, the same expression coming into his eyes that had been there when he drove up the lane toward the vine-covered cottage. Presently he turned, smilingly.

"Not between us, Hop," he said, "for I shall be with you. I am glad that you have stood the test," his eyes emphasizing the sincerity of his words, "very glad indeed. It isn't pleasant to see a lion drop his eyes to a jackal, though it's often the way. But about the work, Hop; I will be able to help you. I don't expect to be right here, but will be near enough for you to call for my aid or advice at any time. I am thinking of buying a little place out in the country. And say, Hop," a sudden trace of anxiety in his voice, "don't you ever mention an office to me, or political work of any kind. It wouldn'e be good for me. My blood is too uneasy. I will help in the refrm work all I can, and will give you adivce; but only on condition that you don't make it a case for reward. Now, good-by, I must attend to that little country business at once."

He stood aside, and let Hopkins walk on. When he turned he found Casey and Bond glaring at him.

"What do you mean?" Casey demanded, "Was it bluff or straight goods you were giving him?"

(TO BE CONTINUED.)



"Does the policeman want to hear?"—*Boston Herald.*

SUFFRAGE AND EDUCATION IN THE SOUTH

THE question of suffrage in the South is uppermost at this time. One of the latest steps to throw out the negro vote is seen in Alabama. The New York Independent gives this in a nutshell as follows:

The Committee on Suffrage has brought in to the Alabama Constitutional Convention its plan to eliminate the negro vote, and it has the merit of some originality and some shrewd boldness. It has two plans, one temporary and the other permanent. By the first, which lasts only till January 1st, 1903, the promise will be kept to take in all white people, and leave out as many negroes as possible. Three registrars are appointed for each county, who must register all old soldiers and their descendants, and all others who show good character and understand the obligations and duties of citizenship under a republican form of government. The registrars are the judges of who are fit to become voters, and will use their white discretion, and the list they make is the permanent one, so long as a man pays his poll tax. That will take in all white people now living, whether they can read or not. The negroes can be kept out because they are not competent. After January 1st, 1903, the ability to read and write the Constitution is required, also that the applicant has been engaged in some lawful occupation for a year, and can show who have been his employers for five years. If he owns forty acres of land or pays taxes on $300 of property he can vote even if he cannot read. The right to vote lapses if one does not pay his poll tax. The purpose to shut out the negro vote and nullify the constitutional amendments is confessed, and it will doubtless be carried out. It will work for a dozen or twenty years, perhaps.

The most unfortunate steps taken in the South as a result of the question of negro suffrage are to be found in New Orleans.

The city authorities here have practically closed all the higher grades of instruction to the negro. They abolish by this act all but the lowest grammar-school grades in the colored schools of New Orleans. It does not affect high school grades, for there are none, and have never been any. But by a late vote of the School Board, all instruction above the fifth grade has been suspended in all the negro schools.

The excuse given for this act was that it was desired to make increased provision for the primary grades, and to introduce mechanical drawing and manual training; but this has not been done, and there has been no increased attendance in the lower grades. The real reason must have been something different; and we shall not go far astray if we assume that it is a feeling that it is not desirable to give negroes more than the barest elements of an education. As to mechanical drawing and manual training, every teacher knows that they are of little value unless continued through the seventh or eighth grade.

According to conservative estimate the school children of color in New Orleans number more than twenty thousand, of whom only about eight thousand were in school last year, two thousand of these being in private schools, which partly supply the lack of provision by the city, and whose support proves the desire of the colored people for education. But the enormous proportion of colored children out of school and unprovided for, twelve out of twenty thousand, shows the serious nature of the problem which confronts the people of New Orleans. The alternative for any population is, either the full school or full jails and workhouses.

NEW WORK OF FIREMEN

ATLANTA and Dayton have a unique system in their fire departments. They clean up the premises after the fire is out, and at Atlanta each hook-and-ladder truck has, in addition to the regular equipment, tarpaulins, tubs, buckets, sponges, brooms, and everything necessary for cleaning up a building after a fire. After the conflagration is over, the firemen take out all of the burnt timber, plaster and laths in the building that have not been entirely destroyed. The goods are covered with tarpaulins to prevent water and plaster from falling on them, and the removal of the charred boards, planks and plaster never fails to decrease the fire loss. The expense is practically nothing, as the work is done by the firemen.

EDUCATING YOUNG MEN FOR COMMERCE

NEW COURSES of STUDY OFFERED BY CERTAIN AMERICAN INSTITUTIONS

BY WILLIAM A. SCOTT, PH. D., DEAN OF THE SCHOOL OF COMMERCE, UNIVERSITY OF WISCONSIN.

THE young man who is in search of a business training may take any one of the liberal courses of study offered by our best colleges and universities and he will secure a training that is of the greatest value. He will fail, however, to secure the particular kind of training which he desires and may utterly lack the special technical knowledge which is essential to the successful conduct of commercial enterprises. The atmosphere of the scholar, the literary man, or the artist, is not that of the business man, and a person who lives in that atmosphere for a considerable length of time is apt to have his taste in that direction developed; and while his capacities for other lines of activity may not be in any sense impaired, indeed are almost certain to be developed, yet he is not liable to enter into the details of industrial activity with as much vim and as much interest as the man who has been especially trained for that particular purpose, or even as the man who has not had a taste of the pleasures of the life of a professional scholar. I would not, on any account, discourage a young man who expects to devote his life to business from taking a liberal course of study. But I do wish to affirm with emphasis, that the ordinary liberal course of study in our colleges and universities does not give the sort of training or the technical knowledge which a business man needs and which he must have if he is to succeed in the conduct of the great commercial enterprises of this country at this time and in the immediate future.

No less than five of our leading colleges and universities have opened new commercial courses or schools of commerce. In the case of at least two of these institutions the courses announced are of the same character as those which have been pursued in our larger institutions for many years, and, therefore, represent nothing new for the country as a whole, though they mark an important step in advance for the institutions in question. The universities of the City of New York, Pennsylvania and Wisconsin, however, have inaugurated a genuinely new departure in the form of technical courses for the training of young men who wish to engage in commercial pursuits. Their purpose is to furnish to such young men the same sort of training that is now supplied to prospective engineers and farmers in schools of engineering and agriculture. This particular branch of technical education is new in this country. As I stated in the Railroad Gazette of New York several months ago, the University of California made a beginning along this line two years ago and, therefore, deserves the honor of having been the first to enter this new field; but this seems now destined for the first time to take its place by the side of other branches of technical education in the leading colleges and universities of the country.

The term technical education as applied to commercial pursuits need explanation. It must be distinguished, on the one hand, from the study of history, political science and economics, as it is ordinarily pursued in our institutions of higher learning, and, on the other hand, from the study of those features of the technique of commerce which can only be learned in the actual conduct of business.

The study of history, political science and economics, as now pursued, deals with the characteristic features or the more general aspects of society. Its aim is to discover the laws of social development. It deals with facts for the purpose of revealing the general principles which lie back of them, and the subject matter of the study, as it is presented to students, consists chiefly of the general principles which have already been discovered, and concrete facts are presented usually by way of illustration only. There are, of course, exceptions to this general statement. Advanced students are put to the study of details and concrete facts, but the purpose of their work and the aim of the instruction which is given to them is to establish scientific principles, and not to solve practical problems. The importance of studies of this sort cannot be over-estimated, and it is certain that they must constitute the basis for the technical education of which we are speaking; but the fact is patent that a student may pursue these lines of study to a very great length without acquiring that familiarity with the business world and with the problems of actual business life which is essential to a person who expects to succeed in large commercial enterprises. The technical education of the prospective business man must aim primarily at giving him this familiarity. Its purpose must be to enable him to solve successfully the problems which he must meet in the actual conduct of affairs. It must aim to give him such information as is of importance in his business, and it must teach him to apply the principles of natural and social science to the actual conduct of commercial enterprises.

There is a certain form of technical education which no school or course of study can supply. Every business establishment has its own peculiar methods which can only be acquired in the institution itself. The management of a great business concern also involves the control of men, the organization of details, and the solution of problems which arise from day to day and cannot be anticipated. Technical courses of study may assist a young man in developing his power along these lines; may reveal to him in a general way the nature of the questions which will confront him; but the actual skill which is essential to success can only be acquired in the actual doing of the things themselves. One cannot be certain that he possesses the ability to lead, organize and control men until he has actually attempted to do these things. No amount of instruction about the problems which such leadership involves will actually give him the power, although it may assist him in the work.

Between this sort of technical education, and the study of history, economics and political science, as it is at present pursued, there is a wide gap which it is the purpose of the new schools of commerce to fill. It is manifest that they cannot guarantee to turn out successful business men, any more than the engineering school can guarantee to turn out successful engineers. They cannot furnish all the knowledge that is necessary for the conduct of business any more than the engineering school can furnish all the knowledge that the engineer needs. Nothing can take the place of the actual conduct of business in the acquisition of certain forms of knowledge, and nothing can take the place of history, political science and economics as a means of educating the student, and of laying the necessary foundations for the technical studies which it is the especial purpose of schools of commerce to supply.

The problem before these schools is a difficult one and it will not be perfectly solved until considerable experience along this line of education has been acquired. Mistakes will unquestionably be made at the beginning, but it is a matter of no small significance that such institutions as the Universities of the City of New York, Pennsylvania, Wisconsin and California have definitely attacked the problem, and have placed themselves in the way of acquiring the experience necessary to correct the mistakes incident to pioneer work. The programmes which are being followed are necessarily tentative, and they represent the solutions which the institutions in question have proposed for the problem before them.

In working out its programme the faculty of the University of Wisconsin asked itself the question,—what sorts of knowledge does the young man need who in the immediate future is to carry to a successful issue the great commercial enterprises of the United States? Its answer to this question is in substance as follows:

I. He should be familiar with the nature and workings of the industrial organism of which he is to be a part and through the manipulation of which he must accomplish his ends. In order to give him this familiarity the following five lines of study are offered:

(1). Courses in commercial geography, which deal with the sources and distribution of the raw materials of manufactures and commerce, the present location of the most important branches of manufacturing industry, and of the chief routes of commerce, and the circumstances which determine, and from time to time, modify their localization.

(2). Courses in transportation, in which the student studies the transportation systems of the most important countries of the world, including their railroads, canals and ocean

steamship lines, the various methods of classification of goods for transportation purposes employed in different countries, methods of rate-making, the various systems of government ownership and control, consolidation and pooling, traffic organizations, and in particular the characteristic features of the transportation system of the United States.

(3). Courses in money and banking, which are designed to acquaint the student with the nature and functions of money and banks, the monetary systems of the great commercial nations, the laws and methods of foreign exchange, the various kinds of securities which are used in international and domestic commerce, stock markets, bi-metallism and monometallism, and the history of the currency systems of the chief commercial nations.

(4). A course in business organization and management, which might perhaps better be described as a course in private administration, to distinguish it from the courses in public administration which are given in the departments of political science of our universities. This course includes a study of the various forms of business organization, such as corporations, partnerships, private business concerns and trusts, the organization of commerce in its various branches including the various classes of middlemen and the markets for various sorts of products, and the methods of organization and management of typical concerns in the various lines of industry.

(5). Courses in economics and economic history. It is impossible to understand existing business institutions without the study of the circumstances which brought them into existence, and which from time to time modify their character and forms. Hence the necessity of courses of this sort. The study of economic history familiarizes the student with the actual growth and development of industry, while the study of economics reveals to him the principles involved and the real nature of the forces with which he has to deal. In these courses emphasis is laid upon the history of commerce and upon the theories which have influenced and still affect the commercial policy of nations.

II. Besides a knowledge of the nature and workings of the industrial organism the prospective merchant should be familiar with the various processes through which the chief articles of commerce have to pass before they reach their finished state. This sort of knowledge the school proposes to furnish in the form of courses in what it calls the materials of commerce, which courses will be carried on in connection with a commercial museum. The university already possesses as a nucleus for such a museum about 5,000 economic plants, together with the various commodities manufactured from them, an excellent collection made by our School of Pharmacy. It expects to enlarge this collection in the immediate future and hopes to be able soon to equip its museum with samples of the most important articles that enter into the commerce of the world. The courses in the materials of commerce will consist of a study of the history of the various commodities from the raw material to the completed article, and will include a study of the various processes and forms of adulteration, of the qualities of goods, and the costs of their manufacture.

III. A knowledge of certain branches of law is now a desideration for the business man. Accordingly, among the technical courses of the school are included a course in the commercial law of the United States, courses in tariff legislation, laws pertaining to labor, capital, corporations, etc., and courses in the commercial law of various foreign countries with which the United States engages in commerce. All of these are special courses designed to meet the needs of business men and in consequence will not be so detailed and technical as the courses on the same subjects given in the law school for prospective lawyers.

IV. The man who expects to represent an American business house in a foreign country should be familiar with the language which his customers speak. In many parts of the world American firms are now at a great disadvantage. Their agents lack a knowledge of the language and are obliged to deal with their customers through interpreters or by means of printed circulars and announcements translated from English. This disadvantage has been felt to such an extent that foreign agents are employed in large numbers to transact business for American houses. It seems to us at the University of Wisconsin that young men who expect to engage in the commerce of the United States in the immediate future should be equipped with at least one foreign language, and we have accordingly made the acquisition of a reading, writing and speaking knowledge of French, German or Spanish a requirement in our School of Commerce. In addition we offer instruction during the coming year in Italian and Russian and have so arranged our courses that it is possible for a student to acquire a second language if he so desires. In the instruction given in all these languages especial attention is devoted to commercial correspondence and business and legal forms.

V. The sciences of Physics and Chemistry are used in industry in such a variety of forms that at least an elementary knowledge of them is necessary for the well equipped business man. Our course, therefore, includes a year of work in each one of these sciences. The course in physics is followed by a course in the generation and transmission of power, which will give the student such a practical knowledge of the application of steam, electricity and water power to the conduct of business as will enable him to avoid the mistakes in the expenditure of energy and the investment of capital which have so frequently wrecked otherwise promising business enterprises. The course in chemistry is necessary to the study of certain of the materials of commerce mentioned above, as well as useful in a thousand ways which cannot be anticipated.

VI. The above branches of study are required of all students who are candidates for the degree, no matter what particular line of business they expect to enter. In addition the plan of the school includes certain groups of courses designed to furnish preparation for particular lines of business. For the coming year we offer a group of courses preparatory to the consular service. This group will be organized and conducted by Hon. J. C. Monaghan, who, while serving the United States as Consul to Germany during the last twelve years, made a special study of commercial education in Europe, and is well equipped in every way to furnish students the technical instruction which is needed for the consular service. Our plan also includes the organization of a group of courses preparatory to the banking business, and other groups designed to give students the technical knowledge necessary to engage in commerce in the Orient, in South America and the West Indies, and on the continent of Europe.

Such in brief is our plan. We expect to learn much from the experience of the present year and we shall doubtless largely supplement and perhaps modify these courses in the future. For the present they seem to us the best that can be devised for the purposes in view. We believe that a course of study such as has been outlined will possess very great educational value. It will be accompanied by thorough courses in history, economics, political science, mathematics and English, and opportunity will be given to a limited extent to make selections from the large number of courses given in other departments of the university.

At Wisconsin we propose to place this new course in commerce on the same level with the other courses in the Colleges of Letters and Science and Engineering, and to grant to the student who successfully completes it a baccalaureate degree. We believe that the educational value of the course will be in no respect inferior to that of any other course given in the university, and in the correlation of the courses and the methods of instruction we expect to keep in mind the fact that the young man who expects to do business on a large scale needs to be educated in the best sense of the term, as well as equipped with the technical knowledge which the prosecution of his business requires.

MAKING CHLORATE OF POTASH

IT is a subject of more or less interest that a salt found only at Strassburg, Germany, known as muriate of potash, is brought to this country to be made into chlorate of potash by the electrolysis process at the Niagara Falls power house. No less than 5,000,000 pounds are used in the United States every year, it being employed in the manufacture of parlor matches, smokeless powder and blasting compounds. It finds a place in the manufacture of torpedoes and the various colored lights so popular at times of campaign and similar illuminations. It enters into allizarine dyeing, is used in making oxygen gas and enters into cough mixtures and other medicines.

COLD STORAGE TRANSPORTATION

SOME OF THE PROBLEMS BEING WORKED OUT IN THE SHIPMENT OF PERISHABLE GOODS ON LAND AND SEA

THE extent of cold storage transportation is scarcely realized even by those who live in the great cities and enjoy fruits for months, which they formerly enjoyed for weeks or days. And yet great as this new line of industry has become there are problems now being wrought out which will, without doubt, vastly increase the scope of its operations. On sea and land new steps are being taken almost daily to improve transportation facilities and increase the effectiveness of the service. On the sea, strange as it may seem, the problem is easier to solve than on the land, especially in building new ships. On these, great refrigerating plants using ammonia gas to create artificial gas can be put in and perishable supplies carried around the globe. Today immense freighters are being built on the Pacific coast—vessels of 20,000 tons each, the largest freighters in the world—which will carry our perishable produce to China and Japan, delivering them in a fresh condition at Hong Kong and Yokohama. Australia, Tasmania, and New Zealand are sending fruit, especially apples and oranges, in great quantities to Great Britain, a 40-days' trip across the equator, while regular consignments of other perishable garden and orchard products are being forwarded to the markets of northern Europe from the Cape of Good Hope. In Australia this business developed out of the meat trade, frozen mutton being sent to England from that country long before anybody thought of attempting to ship fruit. The transportation of orchard products over such an enormous distance by sea, crossing the tropics on the way, is certainly a wonderful achievement. In the early days of the enterprise great losses were sustained, half of a cargo being sometimes found rotten and worthless on arrival; but such misfortunes taught valuable lessons, and nowadays a loss of 5 per cent. is exceptional.

One thing that has been learned is that the fruit must not be shipped in mass; it must have ventilation to prevent the accumulation of the carbonic acid gas which emanates from the fruit itself. To pack the perishable merchandise so that it may not be in solid bulk, and yet in such a way that it cannot shift, endangering the safety of the ship, is another of the problems that has been worked out in connection with the development of this remarkable commercial undertaking. Ammonia, by the way, is the means of refrigeration employed.

Autumn in the southern hemisphere, of course, comes at the time of year when it is spring with us. The Australians pick their apples from the trees in March, pack them, load them on shipboard, send them a 40 days' voyage across the equator, and deliver them in London early in May, sound and in fine condition, at a season when the market there is bare of that fruit.

Thus England has apples all the year round, the Australian product filling in the months when American apples are not obtainable. In like manner peaches and plums arrive from the Cape of Good Hope during the "off" time for those delicacies. So little is known in Europe of the possibilities of cold storage that visitors at the Paris exposition, particularly the French, in numerous instances, refused to believe that many of the fruits exhibited by our department of agriculture were actually grown in the United States. They insisted that they must come from the southern hemisphere. "The United States is in north latitude," they said, pointing to a map. "France, likewise, is in north latitude. We have no fresh fruits left over from last year, and it is impossible that you should have them. These apples are beautiful, but they must come from Australia."

Of course, the fruits in question were kept fresh by cold storage. The department of agriculture had a small refrigerating plant at the exposition, and the fruits were withdrawn gradually as they were needed for exhibition.

Every properly equipped trans-oceanic steamship nowadays has a refrigerating chamber for its table supplies. Passengers enjoy the luxury of sweet, fresh milk all the way across the Atlantic, and on the last day of the voyage each one finds a cluster of roses or carnations, looking as if freshly plucked, at his or her dinner plate. That bouquet is a matter of special pride with the company. It is a little triumph of the wonderful system of cold storage.

A special writer in the Boston Herald, referring to some of the difficulties of land transportation of refrigerated goods, thinks the days of the ice refrigerator cars are already nearly numbered. Not only does the ice constitute about 30 per cent. of the weight which must be paid for at the same rate as the fruit, vegetables or meat, but it seems that at intervals along the railroad lines over which such cars travel, there must be ice stations to furnish fresh supplies, and the distances at which these are located have to be very nicely judged, in order that the stock of cold may at no time give out.

Sometimes the stations are provided with natural ice, and in other cases with the artificial kind; it all depends on which is locally cheaper. But, no matter how carefully the business is managed, the accurate gauging of the ice supply is always difficult, because a train—going across the continent, for example—descends from chilly mountain heights into warm

Laboring man (sizing up the situation)—"I m a fool'
Los Angles Times.

valleys, or vice versa, and at any time a change in the weather may double or treble the quantity of ice demanded.

Hence, and also because of the heavy cost of transporting the ice, it is earnestly desired to find some other means of refrigeration. Ammonia gas, which serves so admirably for cold storage in buildings, is of no use on the rail because a freight-car is not big enough to hold the necessary plant, and it is not practicable to connect a number of such vehicles together with pipes for the purpose, inasmuch as the latter would not stand the pressure. The gas can be compressed, but that takes power, which costs money. On a steamship ammonia works all right, plenty of space being available for the requisite engine and other apparatus.

One method recently tried in California, which seemed very promising for a while, was refrigeration by the liberation of compressed air, the latter being stored in receivers on board of the car. It was thought that the work of compression could be done economically by the locomtive, or perhaps by small compressors attached to the running gear, one for

each car. Thus far, however, the plan has not proved practicable. Another scheme now being experimented with utilizes liquid air, and Mr. Tripler, the famous manufacturer of that product, has been employed by a large concern in California to develop a contrivance adapted for this special purpose. Under his superintendence a liquid air plant has already been put up at Los Angeles, and results are eagerly awaited.

When the system of cold storage transportation on land is more highly developed it will mean an immense improvement of many sections of the south as well as the north. Already large sections of country are devoted to fruit culture which are entirely dependent on cold storage transportation for a market. Pears, peaches, plums, nectarines, apricots, cherries and strawberries come all the way across the continent from California in cold storage vehicles, being rarely shipped without ice even in the coldest weather, because of the risk of a thaw.

Oranges are refrigerated only in warm weather, but they are mostly transported in winter, the same cars being used to protect them from injury by the outside cold. Such cars, it should be explained, are built with double walls, between which is packed some insulating material, such as mineral wool, fine charcoal or specially prepared felt.

To a less extent, cold storage transportation has been applied to vegetables. Great quantities of egg-plants are shipped from the South in this manner, and string beans and green peas are brought by the carload from Florida and other gulf states. From California cauliflower and celery are being supplied to the eastern market, and other such horticultural delicacies are made available for folks of ordinary means through seasons that grow longer every year.

One very interesting development of the business of cold storage transportation is the so-called "pony refrigerator." This comparatively new idea was originated by Florida growers, who, having small patches of strawberries or other perishable fruits, wanted to send their product to the northern market, but were unable to do so because they could not make up entire carloads. To get over the difficulty, they began the construction of ice boxes, some of them so tiny as to hold only a couple of bushels of fruit, the latter being so stored as not to be in contact with the ice.

In this fashion great quantities of strawberries and other such merchandise are shipped from the South, the fruit being thoroughly chilled as a preliminary, and then re-iced just before the start. The "ponies" are easily hauled to the car and placed aboard, being handled thenceforward like ordinary freight packages, and, on reaching the city of destination, they are taken direct to the commission houses to which they are consigned.

As may easily be realized, this invention is an immense boon to the small grower. It gives to the individual a chance for himself, enabling him to offer his wares to the distant consumer—the consumer, that is to say, who pays the biggest price. Any man in Florida today who has a patch of strawberries large enough to yield two bushels at a picking, and who is within easy reaching distance of an icehouse, can send his fruit to the North as readily as the capitalist who deals in carload lots, and with the same assurance as to results.

In 1888 the largest fruit refrigerating transportation company had only 60 cars in use. In 1892, four years later, it employed 600, and now it has several thousand refrigerator cars, while its leading rival claims even larger capital invested in rolling stock.

ODD, CURIOUS AND SINGULAR

MADE MONEY IN AN ALMSHOUSE

A NEW YORK paper records the fact that William Mongrief, a pauper on Blackwell's Island, has just been asked to leave on account of becoming too prosperous. Mr. Mongrief is on the shady side of 50. When he was sent to the almshouse three years ago he was without a cent in the world. He did have a small supply of tobacco. That was his nucleus. His small stock of tobacco was disposed of for cash and always something to boot in the shape of crutches, knives, clothing, shoes, or anything else of value among the paupers. If he bought anything himself it was always at the very lowest pauper price, and if he sold it, it was at the highest possible figure. The result was that after he had been in the institution a few months he was looked upon in the same relative light as is Russell Sage by the outside world. His pile of money and his stock of miscellaneous pauper wares grew until it came to pass that whenever any of the inmates wanted to make a purchase the desired article could always be had from him.

The superintendent knew that trading had been one of the pleasures and pastimes of the inmates since its inception. No special attention was paid to the trading done by Mongrief, because no one suspected for a moment that it was of such proportions.

So it was that while the extent of his business was known among his fellows, it did not reach the ears of the officials of the institution until recently and then only through accident. They found that he had not only everything portable and of the slightest value that had belonged to the other inmates, but besides he had saved in cents, nickels, dimes and coin of larger denominations more than $300.

The superintendent's astonishment was not assumed; yet he was forced to admit that he could not deprive Mongrief of the belongings which he had accumulated. But he suggested to the shrewd merchant in unmistakable terms that his field of operations was much too small and that he had better leave the scene of his peculiar business exploits for another, where he could operate on a more extensive scale.

FROM SLAVERY TO WEALTH

AGGRESSIVE Yankee thrift is the keystone to many American fortunes, and it is seldom expected to find such qualities in a negro who was born to a life of slavery. The exception is found in the case of the wealthiest negro in America, who was born a slave in Henry county, Virginia, 64 years ago. His name was Abingdon, but he preferred that of his slave father and took the name of Edward Dillard—'Dr.' Dillard, his friends style him, for he was once a successful druggist in Chicago for several years. He made his escape from slavery in 1863 and made his way to Pittsburg, where he made $2.50 a day shoveling pig iron, and lived on 30 cents a day until he had saved up $1,400, when he bought a horse and cart and began peddling coal, working in the day and studying at night. He went to Chicago and opened a drug store. He employed a capable drug clerk, whose duties were to wait on customers and teach the proprietor the druggist's art. His establishment was burned in the great Chicago fire, but he was saved from loss and made a litle better off by an insurance policy of $10,000. He again opened up in the drug business, but soon sold out for $22,000 cash. He then went to Australia and embarked in the cattle business. In the meantime he had purchased, years before, a piece of suburban real estate which is now in the heart of the city of Chicago, and for which he has recently refused an offer of more than $200,000. When he took his departure a little more than 37 years ago he left behind him a son and daughter. He found both living in Reidsville, N. C., and they are to receive a goodly share of his fortune. 'Dr.' Dillard says he will not return to Australia. He is an unassuming and well-mannered colored man, and speaks of his old owners as "marster' or 'mistress.' He says that the greatest fault of his race is that they do not know the value of a dollar.

PERFECTLY FIRE-PROOF

SOME interesting experiments have lately been made by the Paris fire brigade with the view of ascertaining what building materials offer the greatest resistance to fire. A square building made of armored cement was built and provided with three doors. One of these was of iron, the second of non-ignitable wood, and the third of glass cast on a certain metal. The building was then set on fire. It was found that the armored cement offered complete resistance to the flames, as also did the door faced with glass. It took an hour to burn the wooden door, but the door of iron was quickly warped, and cases of wood placed three yards behind it were destroyed by the fire.

THE BIBLE IN THE PUBLIC SCHOOLS

EDUCATORS OF NATIONAL PROMINENCE EXPRESS THEMSELVES ON THE IMPORTANCE OF RELIGIOUS TRAINING

WRITTEN ESPECIALLY FOR OUR DAY BY JANE A. STEWART

THE National Educational association, in its recent great meeting at Detroit, Michigan, where over 5,000 teachers assembled from all points of the United States and from Canada, gave particular and repeated emphasis to the view now held by all thoughtful educators: That character building must be the aim of all who labor for the good of humanity. The teacher must not be permitted to say: "I work only for the intellectual good of humanity, leaving to other agencies the care for moral and spiritual candidates."

"Over every true school," said President Farmer of Brown University, speaking of "The Moral Element in Education," "might well be inscribed the sentence which we find in Genesis: 'Let us make man.' That great purpose, anterior to creation, lies behind all the work of the teacher." Teaching is a species of creation, in his opinion. "But the fact is," he said, "that for the past few centuries we have tried in our schools to produce minds rather than men. We have given our whole strength to neutrality, often ignoring the physical basis on one side and the entire gamut of desire and volition on the other. Modern psychology makes the will central in human nature. To possess a will active, and active on the side of righteousness, is more than to carry in one's heart all tongues ancient and modern, or to be familiar with all the sciences of the world."

Superintendent Thomas Mott of the Richmond, Ind., public schools held in an analytical and logical paper that true education combines mental, moral, physical and religious teaching, and that the educational purpose is defeated if either aspect is shut out from the pupil's view. The experiences of the spirit world are essential to growth and a fundamental part of school work is to lay hold of the vital experiences of life and to bring them into the life of the child. The school has become, as Mr. Mott indicated, year by year more socialized, the pupil becoming familiar with the chief values of social civilization before leaving school. The chief activities of the business and industrial world are being brought into the school. But the church, he pertinently pointed out, which stands equal with its sacred literature and spiritual teachings, still remains distinct from American public schools. No attempt has been made to co-ordinate these two great factors in civilization. The misconception by many of what religion is was pointed out by Mr. Mott. The contention that all religion is superstition arises from ignorance. Religion is in fact a part of man's psychical nature. To the wellsprings of religion we must credit whatever truth, duty and love have glorified in the life of mankind. Religion is from our consciousness, that region in which all exigencies of the world are solved, the region of eternal truth, rest and peace. It was appropriate to affirm the distinction between morality and religion. Morality does not take the place of religion. "To confuse religion with ethics is to obscure both of them."

Morality is based on deductions from human experience, on utilitarian ground. When the battle is strong between good and evil, however, the human heart finds little help from expediency, but instinctively looks upward for aid to an all-powerful God. Religion is consequently vital to civilization and any complete scheme of education must take large account of the religious education of the child.

In the department of Indian education, where were grouped experts from all over the country, the same idea found expression in the address on "Learning by Doing" by President Frissell of the Hampton, Va., Normal and Agricultural Institute. "While we believe that learning by doing is the right method of procedure in every department of school life," he declared, "there is one department more important than any other to which this method is especially applicable, and that is the department of morals and religion. Christ said: 'He that doeth the will of my Father shall know Him.' Here certainly is an opportunity for learning by doing. In some of our Indian institutions not only are the young people made to feel that their religion is a part of their every-day life, but they are interested in work for the poor and sick, and they give of their time and thought to make life easier for the old people in the poor-house and in the cabins. The pauperizing, hardening influences of the reservation, which causes the Indian to be thoroughly self-centered, can only be overcome as they are thoroughly imbued with the Christian idea of service for others."

President Thwing of Western Reserve College, dwelling on the duty of the University in religious matters, declared that the student should not be taught to be a Congregationalist, Methodist or Roman Catholic. He should have the simple fact impressed upon him that he has a personal God, a Creator. The University should show the comparative worthlessness of the churches and the worth of the church. "I care little for this or that church, but I care very much for my church as denoting the relationship between me and my God," said President Thwing. As to the use of the Bible as a means to secure better religious training, it is gratifying to record the impromptu remarks of Superintendent Ogg, of Kokomo, Ind., who contended that the serious period of departure between the church and the public school lies in the matter of using the Bible. In his belief, the public schools have suffered immeasurably because of the exclusion of the Bible, and he does not believe in substitutes for it. During the discussion he said that a teacher who has tact enough to teach religious poems by profane authors in such a manner as to render them unobjectionable to anyone, can do the same thing in the use of the Bible. Formerly Prof. Ogg was principal of a school in Indiana. He always taught the Bible, but in such a manner as to offend no one. When he left the school, the students presented him with a copy of the Bible as the fittest token of their regard, Protestants, Jews and Catholics alike contributing to it.

THE PRODUCTION OF SHEET MUSIC

THE production of sheet music is one of the newer occupations for American women. All composers of reputation demand that their manuscripts be hand-engraved and this, combined with the designing of frontispieces and fancy headings, calls for talent of a high order. Germany boasts the largest number of trained women music-engravers of any country, and a number of these crafts-women have migrated to the United States. The larger part of the sheet-music brought from London and sold by the American publishing-houses is the product of women's work. Philadelphia has more women and girls employed in music-engraving and printing-houses than any American city. Boston and Cincinnati also employ a great many in music manufacture, and several of the best New York engravers, who fill orders at their own rooms for the publishing-houses, have only women assistants to whom they have taught the trade.

The drawing and cutting-in of the musical characters on the plate directly from the manuscript is almost a mechanical performance, but much tact and musical intuition is necessary to produce first-class work. Nearly all the manuscript sent to the engraver by amateur composers is imperfect, and the accomplished engraver must be able to recognize all faults and omissions, and correct them. Every reliable publishing-house has a professional arranger, who revises the crude manuscript before it is sent to the engraver. Such manuscript is easy of rendering, but where no such person is employed, the intelligence of the engraver must be depended upon. The signs denoting expression often have to be supplied, repetition marks inserted or repeated, a "rest" put in to reconcile the time, and other editing done. In fact, the skilled engraver of music-script must be a good proof-reader and music-editor, as well as a mechanical workman. Often she will contrive to have the "turn" bar at the foot of a page of music fall in a more convenient place than the music-writer arranged for, and otherwise to mold the "copy."

As the plates are worth a good deal in themselves, no girl taken as a beginner receives wages for the first two months or so. And however earnest or industrious, no girl is given the chance to learn music-engraving unless she knows at least the rudiments of music. After initiatory practice, if she evinces talent for the work her salary is $3 a week. At a

later stage she is allowed to do the filling in of transcribed plates or set to making rests, the slurs, the clefts, or pedal marks—any of the more unimportant work that has been left purposely for her to do in order to give her confidence. When she gets full command of her engraver's tools, a whole manuscript is intrusted to her, and her earnings amount to $10 a week. If a girl of this capacity is industrious, she can engrave nine or ten plates in a day, starting work at half-past nine o'clock in the morning, resting an hour at lunch, and quitting her bench at half-past five. A girl who is neat and painstaking, but without the musical knowledge that would admit of her taking responsibility, gets $6 a week. Her work is done under close supervision.

One New York woman has supported herself and family for years as a music engraver. She works at her own home in a suburban town, and the publishers and composers who have employed her pronounce her work second to none in the trade. Several apprentices work under her direction. Another woman, the wife of a busy engraver, who employs a staff of girls, takes entire charge of the workshop when her husband is absent. She is herself a practical engraver, and conducts the business so successfully that there is no blunder in any department, either artistic or mechanical.

Olive F. Gunby, writing of this in the New York Post, adds that the phonograph has opened a fresh field for the woman singer of mediocre attainments. A thriving bureau conducted by two women makes the supplying of phonograph singers a specialty. A woman able to sing pleasing melodies of her own into the instrument gets 75 cents a song. The phonographs, when duly stocked, are dispatched to music-dealers, stationers, and druggists' shops all over the country.

CARE OF FORESTS IN EUROPEAN COUNTRIES

THE United States has not yet learned the true value of its fast disappearing forests. Even in the states where lumber has been the greatest source of wealth few efforts are being put forth to restore and maintain such an income. Instead there are vast wastes of what might otherwise be profitable forest land. Fires are frequent and disastrous and drouth brings loss of millions to the farming population. In one state alone, Minnesota, it is stated that the number of forest fires in 1900 was 139, which burned over 179,521 acres and did damage to the amount of $153,399, while the spring of 1900 was the driest since 1894.

The Forest Fire Warden of Minnesota, Gen. C. C. Andrews, devotes a large share of his recent report to the management of public forests in various European countries. The facts given in such reports have been gathered by him from correspondence with foreign officials. It is not until these reports are inspected that one begins to realize how very far the United States is behind these European countries in the care of the forests. Most of the European countries derive a considerable direct revenue from the care of the public forests, in addition to the indirect benefits that are conferred upon the people at large. In Alsace-Lorraine, the public forests aggregate 338,500 acres in area. The expense of administration is $862,000 and the revenue $1,712,000. The annual yield or cutting of the forest is not allowed to exceed the annual production. The cutting of forests, with a view of using the soil for agricultural or pasture land, has been strictly forbidden since 1803, unless special consent is obtained from the government. Owners of unproductive lands who wish to plant forests receive certain subsidies out of the State treasury, and plantations made on steep mountain sides or on unproductive sand dunes are free from taxation for thirty years. The amount of damage caused annually by fires is said to be very small.

In Austria, the state administers over 2,500,000 acres of forest. There are eight territorial offices and 186 local offices. The annual expenditure amounts to $1,803,755 and the total gross receipts, in round figures, to $2,500,000, leaving a net revenue of nearly $700,000. Owners of forest land in Austria are not permitted to remove the trees without making provision for replanting.

In the Grand Duchy of Baden there are nearly 250,000 acres of state forests, the expense of administering which is $568,000, and the annual revenue $1,235,000. In Bavaria one-third of the entire country is covered with forests. The state forests comprise 2,150,000 acres. The expense of administering the forests in 1891, including new purchases, amounted to nearly $5,000,000, while the total revenue from the forests was over $8,000,000. The damage caused by forest fires in Bavaria is ridiculously small, considering the extent of the forest lands. Such damage is reported in 1890 to have amounted to only $974, and in 1894 to only $1,686.

In Denmark there has been a systematic forestry system in vogue for a century. The state forests of Denmark cover 142,000 acres. The revenue has averaged about $250,000 a year, and the expenses not quite $200,000. The smallness of the net revenues arises partly from the fact that about half the state forests are still quite young. As long ago as 1805 private persons were prohibited from cutting away remnants of the old forests of the country existing in that year.

In France the state forests cover 2,700,000 acres. The gross annual income from these forests is $5,500,000, and the expenses $2,755,000. The French government expends a large amount of money on the reforesting of mountain lands, to regulate the action of the waters and stop the ravages of torrents. For that purpose about $700,000 is expended every year. The average cost of reforesting is said to be about $20 an acre. Private individuals in France are prohibited from cutting and taking trees from forests which are necessary to maintain and regulate the water flow, to protect lands against the encroachments of the sea and sands, or which are necessary for the public health.

In the little Duchy of Hesse-Darmstadt there are 165,000 acres of state forests, the annual expense of administration of which is $148,500 and the annual revenue $561,000. In Italy the area of state forests is 128,960 acres, the total expense of administration averaging about $80,000, while the sale of the raw material from the state forests averages $150,000. In Norway the extent of the state and semi-public forests is 2,587,500 acres. Norway does not make any profit out of this large area of forest land, the annual expense of administration being about $108,000 and the annual revenue between $60,000 and $67,500. On the other hand, in Sweden, which has the immense area of 18,000,000 acres in state forests, the aggregate expense of forest administration in 1895 was only $185,397 and the aggregate revenue is $1,126,636.

In Prussia the state forests cover nearly 7,000,000 acres. The expense of adminsistration has averaged about $8,500,000, while the annual aggregate revenue has amounted to $17,200,000, or a net profit of $1.50 per acre of actual forest. In Saxony there are 732,000 acres of state forest. The annual expense of administration for 1896 was $1,040,000. In the same year the annual gross revenue amounted to nearly $3,000,000. The damage by forest fires in Saxony is said to average only $?00 per year. In Wurtemberg the extent of the state forests is 418,904 acres. The annual expense of administration amounts to $1,183,574. The revenue is nearly $3,000,000 a year or $3.63 per acre net. The amount of damage annually caused by forest fires is less than $650.

As may be supposed, in all these countries which maintain a complete system of forestry the work is placed in the hands of thoroughly competent and reliable men, who are not appointed for a brief period, to pay the debts of some office-seeker or political boss, but who hold their positons for life, subject to good behavior. They receive fair salaries with traveling expenses, house rent, and a pension after a certain number of years.

RELIEF FOR HEADACHES

TOO much blood in the brain is a frequent cause of headache. Pains are felt all over the head, the face becomes flushed, the temples throb and strong light or noise causes excruciating pain. In cases of this kind the sufferer should be careful in diet and should not eat meat oftener than once a day.

Too little blood in the brain is another cause of headache. It is recognized by dizziness, noises in the ears and pains on top of the head. The best stimulant is a cup of strong tea or coffee or a bowl of soup. People who suffer with these headaches should sleep with their heads low.

A neuralgic headache is often the result of cold caught in a bad tooth, which affects the nerves of the face and is accompanied by pains across the forehead or on the back of the head. A mustard leaf placed on the nape of the neck will relieve it. Another remedy which is sometimes effective is a piece of brown paper soaked in vinegar and applied to the painful spot.

Another Automobile Race of International Interest. *The Chicago Tribune*

LIBRARIAN F. M. CRUNDEN, of St. Louis, has been taking observations of the reading of the working people of that city. He finds that as a rule, the mechanic reads along the line of his calling. The carpenter calls for books on buildings, the engineer, the steam-fitter, the molder, the plumber, the smith, each wants the newest treatises in his particular line, and the eagerness with which new books are called for is a most gratifying evidence of the desire for self-improvement, which is one of the most prominent characteristics of the American in every line of life.

As already stated, the greater part of the mechanic's reading pertains to his particular calling, but there is one remarkable exception. The general interest aroused by the wonderful developments in electrical science during the past few years is reflected by the workingman, and if he reads anything at all outside his calling, it is something concerning electricity. Books on electrical science, particularly in its application to any form of mechanism, are always in demand. There must be a vast amount of experimentation going on at the homes and workshops of our mechanics, for there is a special and continuous call for books which give instructions in the manufacture of electrical toys and simple bits of mechanism for instruction and amusement. There is one mechanic in St. Louis whose has dozens of such appliances, all made by himself, for his own amusement and that of his family, while many others pass a portion of their leisure in making the queer little devices which, unless the motor power be understood, seem to move by supernatural influence.

Judging from the call for the Patent Office reports, nearly every American workingman must be an inventor. The black-bound volumes issued from our Patent Office have a repellant appearance to the ordinary reader; they are, in fact, about as full of thrilling interest as a dictionary, but to the inventor class they have a business value which is attested by the constant demand. There is another evidence of the inventiveness of the workingman, an evidence not less curious than conclusive. For many years it has been noticed that there was a certain class of men frequenting the Public Library whose call was for recipe books. Household recipes, for making articles of daily use, were apparently their speciality. They would sit down with a pile of these books in front of them on a table and pore over them all day. For a long time this curious taste in reading remained a mystery, but finally it developed that these men were inventors, jobbers or promoters, who had invented or taken an interest in some article of household use, and were desirous of ascertaining whether anything like it had ever been made before. So with their own recipes in hand, they looked over the books to see what had been previously done in the same line. Shoe blacking, stove polish, prepared glues, cements for various purposes, face washes, soaps, washing powders, dyes, the busy man with his heap of recipe books may be in search of information concerning any one. Just what he is looking for he never tells, for he is mortally afraid that some one will steal and use his secret. The attendants never ask what he is after, but when he comes in and calls for all the recipe books the library contains, they recognize him as an inventor, hand out the books and leave him to conduct his search alone.

The workingman is an omnivorous reader of labor literature. There are several excellent histories of labor unionism, and these are constantly in demand. He seems to possess a longing to read the history of the world's work in the past, and books on this subject, like those on labor unions, have a steady call. The story of his own business has also attractions for him, and if there is a history of carpentry or masonry which he has not seen he asks for it. In the social life of the past he has only a modified interest, though such books as Green's "Short History of the English People," and McMaster's "History of the United States" enjoy a fair circulation. His taste, however, is up-to-date. He is more interested in the present than in the past, and any book dealing with existing conditions is morally certain of wide circulation. The volumes written by Wyckoff two or three years ago, detailing his experiences as an unskilled laborer in search of employment, are always in demand. Since they were placed upon the shelves of the Public Library the original bindings, all worn out, have been replaced by new, and these are in a state of dilapidation which indicates eagerness of public interest in practical experiments like those made by the author.

FLOWERS IN JAPAN

THE arrangement of flowers in Japan is pursued as an art, being profoundly studied by men of rank, philosophers and priests, besides learned and literary men, while ladies of the aristocracy are allowed to practice the art as being likely to inspire such virtues as gentleness, self-denial, forgetfulness of care, and spirituality. A lifetime is, indeed, not room, or on a shelf, and no other flower is allowed to come too long for the Japanese, either man or woman, to devote to an understanding of the subtile meaning conveyed by flowers, and the rigorous rules necessary to observe in producing with them the best artistic results.

The peony, although acknowledged to be the royal flower of China, is still the favorite of the upper classes. It is given on occasions of importance the position of honor on the dais in the principal recess, never is it placed in the center of the near its royal presence. Sometimes art dictates that two black twigs shall be grouped behind it, the thought being to enhance by contrast its abundant life and beauty. The lotus flower also is conceded to have royal national rank and is called the King of Indian flowers. On festive days the Japanese never use it, as they associate it entirely with the spirit of the dead. The royal flower of Japan, of course, is the cherry blossom. The idea of floral rank is one to which the Japanese are very

sensitive and the established laws of precedence must be closely adhered to in the arrangement of their flowers. To an American it seems perhaps inexplicable that they should have placed the purple wistaria high above the white, which they mostly exclude from their compositions.

Irises stand very high in rank, but are regarded as difficult of arrangement, and therefore the most arbitary rules have been invented for their composition. With one large flower but three leaves are allowed, with two flowers seven or fifteen leaves are used, three flowers are given thirteen leaves and five flowers are furnished with eleven leaves.

So deftly are thoughts conveyed by the arrangement of flowers in Japan that often verbal messages are unnecessary. In November, the coquette sends to her lover a leaf, or branch of maple. "Like it," he translates, "her love has changed."

On farewell occasions those called "returning flowers," because they bloom twice a year, are used to subtly express the hope of a safe return. Before people that are ill, blossoms of a sturdy, vigorous growth are placed that health and strength may be suggested. Only very gay flowers are strewn in profusion when supplications are made for those in affliction. Prayers for rain are accompanied by large floral pieces, so arranged as to point from right to left that the east wind bringing rain may be honored, and very naturally the reverse order typifying the west wind is employed when fair weather is desired.

HOME OF THE QUININE INDUSTRY

THE island of Java now practically supplies the cinchona bark from which the world's supply of quinine is made. There are about 25,000 acres of this island used in growing cinchona. The seed was obtained by the Dutch government from Peru and Bolivia, countries which have jealously guarded this valuable trade until it slipped from their controlling grasp.

The so-called "forests" are clearings made from the jungle, and the ground is kept as clean from weeds and rubbish as is a nice flower garden. The trees are planted in rows systematically, and the ground is worked so that the rains penetrate to a great depth. The tree is allowed to grow until it is six years old, when it is ready to be harvested, and, unlike the old system (which many people think is still in vogue), the tree is not peeled alive, but is sawed off at the roots, divested of its bark, and a new tree planted near by, thus making the process continuous. The new trees develop nearly as soon as the bark would grow on again, and according to a correspondent of the Chicago Inter-Ocean, are much richer in quinine and healthier in growth, making it more profitable to follow this process than to strip the trees while they stand and cover with moss, as was formerly done.

The native women then beat the bark off the tree, which has been cut into short lengths, and the wood is dried and used to heat the ovens in which the bark is dried. The drying, however, is largely done in the sun before it is put into the ovens. After the bark has been thoroughly dried it is rough ground, and then packed tightly in bags of 100 kilos each; these bags are then sent to Amsterdam or the Bandoeng quinine factories. Most people know that the manufacture of quinine has always been treated as a very profound secret, and there is not a quinine manufactory in the world outside of Java where a stranger would be permitted to learn anything of the process of manufacture. After the bark reaches the factory every parcel is assayed as to the amount of the various alkaloids it contains, and the natives mix the different lots so that an average strength of alkaloid is represented in each day's work. Tons of bark are ground up every day and sifted by improved machinery, after which it is moistened with an alkali and pumped into immense digesters containing hot crude petroleum. There are agitators inside the digesters which mix the bark well with the oil and thus the oil dissolves the alkaloid from the bark. The oil is then allowed to settle out, and the oil is washed with sulphuric acid water, which in turn takes the alkaloids from the oil; the oil is returned to the storage tanks to be used over again and the crude quinine crystallizes from the hot acid water when it is cooled.

The quinine, after being weighed into the cans, is sent to the stockroom, where it is put in cases, which are manufactured by natives right on the ground. After the goods are all placed in the cases there is a sample extracted from each lot that is represented in the finished produce, and the director of the Dutch government cinchona plantation, who has spent twenty-five years in the service, and who is a disinterested party, comes to the laboratory and applies tests to every sample, which show that in every instance the quinine is above the standard laid down in the pharmacopoeia.

The quinine then goes to Batavia, the principal business city and port of the island of Java, where it is sold at public auction once a month. The quinine is bid for by various brokers, who act for any one that wishes to employ them; they charge a stated commission for their work, but do not speculate in any sense of the word.

BUDDHA'S TOOTH AN OBJECT OF WORSHIP

IN Ceylon, the Isle of Flowers, the Buddhist religion is so amalgamated with the Hindoo mythology which Buddha sought to obliterate that the practical result of his teaching has been to add one more god—himself— and innumerable objects to those already so numerous. The Singhalese still place a servile reliance in their devil-priest and many barbaric practices are indulged in in the name of religion.

There is a curious blending of faiths supposed to be entirely antagonistic one to another. Especially is this brought out at the greatest annual festival of Kandy, assumed to be a great Buddhist ceremony, whereas it is really all in honor of several Hindoo gods and goddesses, the Buddhist's part being simply the nominal loan of a relic—in truth, the loan of an empty shrine. But seeing that the relic in question claims to be no less a treasure than that of a veritable tooth of Guatama Buddha, and is the object of unbounded reverence to all the many million (somewhere about 400,000,000) who worship him, and a relic for the possession of which bloody wars have been fought, and incredible sums of money offered, it is perhaps not to be wondered at that the priests took care to lock it up securely before allowing its shrine to join in the procession of relics of the Hindoo gods.

It is said that Kandy, where the sacred tooth is preserved, owes its very existence as the mountain capital to the fact of this precious bit of bone having been taken there for safety in the sixteenth century. The Dalada Maligwa, the Temple of the Tooth, has been year by year enriched by the offerings of the countless throng of pilgrims who do homage to the relic by offering gifts of gold and silver ornaments, coins, jewels, vestments for the priests, fruit and flowers. The latter are at all times a graceful feature of this worship, for as none care to appear empty-handed before the altar of Buddha, there are few in all the throng of worshippers who have not some flowers to offer. Among the legendary acts of devotion we are told of one who is said to have offered six millions of blossoms in one day to this rapacious tooth. Another daily offered, it is said, 100,000 blossoms all of one sort, a different flower each day.

Externally the famous Temple of the Tooth is not conspicuous, being within the precincts of the old palace, and the whole is inclosed by a moat, with some very ornamental stone.

Buddha's tooth is the central shrine of the great altar in the temple. Upon the altar stands an octagonal cupola of solid silver and gold, supported by slender pillars. In front of this are three miniature crystal dagobas or bell-shaped relic shrines, each resting on a square base, and two golden candlesticks with lighted candles. In the small dagobas on either side are displayed priceless jeweled objects—royal gifts. Within the central shrine, which is of the purest crystal, lies a large golden lotus blossom, from the heart of which, upheld by a twist of gold wire, is upraised the worshipful piece of yellow ivory, which to the unquestioning eye of faith actually passes for a human tooth.

When the great chemist, Chevreul, whose statue was recently unveiled in France, attained his 100th birthday he was entertained at a public dinner at which his son, 67 years old, was present. The old man made a speech, and in relating an anecdote made a slight slip, which his son corrected. Old Chevreul turned around quickly and said in a sharp tone: "Hush, youngster, when I am talking," and the "youngster" held his tongue.

MEDICAL TOPICS OF OUR DAY

THE FAMILY PHYSICIAN ON A STATED SALARY

BY MARTHA B. CANFIELD , A. M. M. D.

IN my opinion the best interest of the family and the public health would be conserved if the plan was adopted of employing the family physician by the year upon a stated salary instead of indiscriminate consultation for each case of illness.

At the present hour medical practice is specialized; the tie which once bound the family doctor to his patients has loosened. Instead of being as formerly a member of the family, loved and trusted next to their God, he has degenerated into the lackey who simply bows the specialist in and out. He so often calls upon the specialist to do the work which he ought to be fully qualified to do himself; for example, to listen to our hearts or siphon out our stomachs, that the programme is evident and the public often avoids the middleman and the double fee by consulting the surgeon primarily; but such sad experiences have resulted from following the advice of those who have no previous knowledge of constitutions and temperaments, that many intelligent people are beginning to feel the need of a family advisor and counsellor as a protection against the meddlesomeness of the specialists, many of them incompetent, who, tempted by the larger fees and shorter hours of special work, prey upon the credulity of humanity and fill the minds of nervous women with suggestions of disease.

Surgery certainly is necessary and reconstructive in notable cases, but the great mass of operative work performed today, almost entirely upon women, is unnecessary and destructive, and the next ten years will reveal its harmful effects in a race of women whose vitality is weakened and whose longevity is shortened. Every household's best safeguard is a family physician, who is so expert a diagnotician that he stands head and shoulders above the narrow-gauged specialist; and who avails himself of all the advantages of hospitals and journals and post-graduate schools until he meets the demand of the public that he be the competent judge for the need of special work. He who knows your constitution, not the surgeon who has never seen you before, should decide whether you have nerve force to withstand the shock of a capital surgical operation.

The greater permanence to which the physician attains in the family the better; with increased facilities for transit he need not sleep and eat with us as did the old-time doctor; but if he is employed by the year or for a term of years, so much the better; for he will have opportunity to study our constitutions and anatomy, and ward off disease by keeping the system up to the standard of perfect resistance. If he knew our fathers and mothers that is also an advantage, for he will know our hereditary tendencies.

Again, the permanent yearly plan is best because it affords the most perfect freedom for both parties. It is often a very delicate question for the physician to decide how frequently and how long he shall continue to visit a patient. The conscientious doctor shrinks from accumulating a burdensome bill. Often the mother follows him to the door and says, "Doctor, we will let you know if we need you tomorrow." He knows that she is unqualified to judge of the condition of the patient, but he is handicapped by this gentle hint. Under the yearly visit plan there is perfect freedom. He may carefully watch the case to complete recovery, and the family may feel equally free to call him early and often, and is relieved of the hopeless task of home treatment for the sick without medical knowledge. When the breadwinner is himself stricken, he mentally ejaculates, "I know that my physician has no motive for keeping me sick."

But the main point is that the yearly plan places the family physician upon a basis where his personal interest is in exact line with his duty. It will now be natural for him to strive to keep the family in health, as the higher the standard of health the lighter his labors. He becomes the sanitarian of the family. It will be quite to his interest to study the family water supply; to demand that the plumbing be scientifically tested and the milk and cream be pasteurized to cut off the approach of germs from without. He will make frequent chemical and microscopical tests with a lively interest, to determine whether each excretory and secretory organ is doing good work. He will compute the percentage of urea, of carbonates, and sulphates, and chlorides, which are being eliminated daily, to be sure that auto-intoxication is not occurring. And surely after this careful and scientific study of the conditions of the family he is much better fitted to cope with any sickness which may occur in spite of his warnings and advice than the doctor called in haphazard and obliged to prescribe on the spur of the moment with no previous knowledge of his patient. And it also follows that much suffering and even loss of life may be prevented by this plan, as each case is treated in its incipiency and lesions removed before degeneration occurs; while under the daily visit plan many families delay calling the physician from natural inability to diagnose disease, or with the hope of avoiding a doctor's bill, until disease has made such inroads upon the system that a long course of sickness is unavoidable, and perhaps death inevitable.

The daily care of a family physician ostensibly conserves the public health by the influence of conservative counsel along the lines of sanitation and prevention, and specifically, by the early diagnosis and isolation of contagious and infectious diseases before other members of the family or neighbors are exposed, thus limiting the spread of epidemics. This care would prevent the occurrence of instances, for example, which have been numerous during the present epidemic of smallpox, where intelligent families have passed through mild attacks of this disease innocently supposing it to be chickenpox, have attended parties and weddings, exposed hundreds, and entailed a vast amount of suffering, deformity and public expense.

To recapitulate: The system of employing a family physician by the year at a stated sum conserves private and public health, because it affords protection against the abuses of specialism.

Because it gives perfect freedom to doctor and patient.

Because it places the physician in the true attitude, that of prevention rather than cure.

And because the result is many illnesses avoided and unavoidable sickness treated early with a minimum of suffering.

I believe the ideal physician of the twentieth century will be the all-round developed family physician, and that his business will be to keep the family well. To insure his support without being obliged to take too many families upon his hands, thus weakening his mental powers and preventing his best work, the twentieth century family must be willing to pay the large fees for prevention of degeneration that it now pays for the removal of degenerated tissue. Still there will remain a large balance once paid for nurses and drugs.

CURING "INCURABLES" BY OXYGEN

LONDON is not a capital where one expects to discover new methods of treatment in surgical or medical cases; but there is at least one hospital where remarkable results have been obtained by an original investigator. This is the Oxygen Hospital, in Fitzroy Square, under the patronage of Princess Louise, Duchess of Argyll. It is not a large institution, and it is dependent upon private benevolence; but the work accomplished there merits more attention than it has received from the medical profession of the United Kingdom and the United States. Patients pronounced incurable in general hospitals are cured there at the minimum cost of half a crown a week for oxygen treatment. The percentage of cures is 90, even when the poorest and most neglected patients suffering from loathsome diseases are in the ward.

The discoverer of this system of local treatment of wounds and ulcers by oxygen is Dr. George Stoker, an Irishman by birth. He was the chief of the Red Cross ambulance in the last Turkish-Russian war and Stafford House Commissioner in the Zulu war, and subsequently he became a specialist in diseases of the throat, nose and ears. When he was in South Africa he observed that the wounded Zulus when taken to the uplands, where the air was extremely pure and dry, recovered with extraordinary rapidity. There was no surgical treatment and no dressings were used; but the wounds healed quickly and surely in pure air. Their experience suggested to the Irish surgeon the idea of exposing not only wounds but also ulcers to the direct action of oxygen.

The treatment is simple and painless. The wounded or ulcerated surface is washed twice a day and kept inclosed in

a receptacle where oxygen, pure or diluted, can be continuously applied to it. Some of the patients have caps filled with oxygen which they wear day and night. Others have arms and legs in India rubber bags or boxes which are fed with oxygen from receptacles near the cots. Boxes are preferred, because they are more satisfactory for clinical observation, but bags of the simplest construction alone are required for feet or hands. The apparatus is adapted to the case, and the oxygen is turned on and off by tap once in five or six hours. Face caps are fitted to the skin with adhesive plaster and the oxygen is passed in by tubes. The patients are entirely reconciled to bags, boxes and caps, for they have found in them from the outset relief from suffering. Some of the poor creatures had not been free from pain for many years until they entered this hospital.

Dr. Stoker contends that in addition to the stimulative and vitalizing effects of this treatment some profound chemical change is effected in the surface of the wound by a process of oxydization. He asserts that as a rule the cicatrices formed by ordinary methods of healing do not last, and that whenever a strain is put on them the patients after getting about break down again. The oxygen cicatrices, he states, are like new, healthy skin, and when the patients are once out of hospital they are permanently cured and do not return, since the process of mending is physiologically perfect. Some of the conclusions which he draws from an exhaustive study of oxygen treatment are these: It heals where every other form of treatment has failed; it does this rapidly; it allays pain; it forms healthy vascular skin, and it is more economical than any form of surgical treatment.

Every case is photographed on entering the Oxygen Hospital, and the process is repeated from time to time as progress is made toward recovery. There is a series of photographs for each case under treatment, and Dr. Stoker is enabled when he delivers lectures before medical and clinical societies and hospitals to illustrate his work with precision.

A correspondent of the New York Tribune adds that special efforts are now being put forth by Dr. Stoker to secure the construction of a cubicle where the supply of oxygenated air can be regulated, so that consumptive patients can remain twelve hours at a time where they can breath the stimulative and curative oxygen. The doctor firmly believes consumption can be thoroughly cured by this method.

REDUCING FLESH IN SUMMER

STOUT people find the summer months particularly trying and are quick to seek their family physician for advice to rid themselves of the burden of superfluous flesh.

Excessive fat and excessive thinness are both results of an unhealthy condition. Massage, by inducing a normal and healthy condition, may either increase or reduce flesh, and so is a valuable aid to fat people who will not do their own exercising. Massage rollers which, in varying forms, may be bought at any drug store, are a good thing if the patient cannot afford the services of a good masseur and must do her own massaging. In massaging for reduction no fatty oil should be used. There are jellies, soaps and other preparations which may be substituted and do not feed the fat cells.

Rational breathing is a vital part of the required exercise, but is utterly neglected by many would-be-thins. Fat people are short winded. They breathe with only a part of their lungs and do not take in enough oxygen to burn up the desired amount of carbon or fat. The fat woman should study and practice breathing with unflagging duration. It should be as regular a part of her morning and evening regime as any feature of her toilet and should be practised during the day. A few lessons in breathing from a teacher of physical culture are a good investment, but even without scientific lessons one can stand by an open window and draw twenty deep breaths that will completely expand the lungs.

A still better exercise is to raise the arms straight, with the palms meeting high above the head, then draw a deep breath, rising on tiptoe with the breath, and take several steps on tiptoe, slowly and gradually exhaling and dropping the arms during the steps. All breathing exercises, to be useful, must be taken in pure, fresh air.

Diet is even more important than exercise in flesh reduction and there are fewer persons who will persist in it faithfully. The fat woman usually has a taste for the very articles of diet that are flesh producing, and either will not give them up at all or diets inconsistently and spasmodically.

Many of the famous flesh-reducing systems demand strenuous dieting. Banting allowed only about fifteen ounces of meat or fish a day, a very few vegetables and no milk, sugar, bread, etc. The Saulsbury method gives a diet of chopped beef, very rare, and a little stale bread, with very hot water an hour before each meal. This system is rapid, but so severe that no one is likely to keep it up for long at a time, save in desperate emergencies.

The most practical system of diet is one that, while not vigorous enough to be very trying, is rational and, in the long run, effectual; a sensible diet that can be kept up indefinitely without great privation. Such a diet is an easy matter in the summer, for few summer delicacies need be blacklisted. Nature doesn't crave heavy, starchy and sweet food in hot weather, and the things for which the average woman longs in summer are the things the fat woman may have without infringing upon diet rules.

Bread must be positively given up. Sugar must follow. This shuts off puddings, pies, candy and, unfortunately, ice cream. Potatoes are forbidden and little milk and cream are desirable. Liquor must be left out absolutely. Physicians agree that beer, whisky, champagne, cocktails, in fact, all alcoholic drinks, save white or old wine in very small quantities, are fat producers and that their use can neutralize any reducing diet. Water must not be drunk during meals, nor until an hour after meals. Above all, regularity and persistence are essential.

INCREASED USE OF DRUGS

THE sale of the poisonous drugs, opium, morphine and cocaine, is steadily increasing. In most places laws are openly violated by druggists and in some states explicit laws have not been enacted. In Illinois the laws are plain enough, but not enforced. At the Chicago House of Correction, Dr. Sceleth, the House physician, is alarmed at the growing number of slaves of habit. He said in a recent interview:

The cocaine habit is gaining with such fearful rapidity that the city authorities and druggists in general should join together at once to suppress the traffic here. It is not alone gaining among the wretched and miserable, but among the higher classes, and one strong reason for this is the ease with which children, boys, young men, and men and women can secure the drug.

Most of them begin, of course, with opium. It is useless to say why. A thousand and one reasons exist why people do these hideous things. It is sufficient that they do them. Opium is easily secured. It is smoked in dens and private establishments without any police interference, unless it becomes too conspicuous. After a time—say five or six years—opium no longer satisfies. Something stronger must be secured. The irresponsible druggist, or even men of my own profession, I am sorry to say, are ready to furnish that something stronger, providing they get their profit. Morphine is supplied, and for a time that keeps the victims up.

"But later they must have still stronger stimulant, and then cocaine is resorted to. It is either taken with the 'gun' or by sniffing it up the nostrils. Perhaps the first liking for it is cultivated through certain medicines sold on this market which are strongly tinctured with cocaine. Once fixed in the habit the victim must have more and more of the drug every year. Where five or ten grains would have done once, now twenty and thirty a day are needed. Then forty are used and then sixty, and finally the victim commits some petty offense, is arrested, tried and sent out here. The justice may know that he is dealing with a cocaine user, but he takes no cognizance of that. If he did he would send them out here under a long sentence.

But under a short sentence they come here, get a clean home for a month, have wholesome food, and when free go away for another cocaine spree. We get them over and over again, and the public pays for such foolishness.

In one instance where we had a woman here, a cocaine user, she had to serve a year. We sent her from here cured of the habit. She has taken no cocaine since. We not only built up her body, but we aroused her moral sense, and once that and the will power is stirred we can break the cocaine habit. If the will is not roused we cannot break it.

INCUBATORS FOR FRAIL BABIES

LATEST METHOD OF PRESERVING THE LIVES OF PREMATURELY BORN OR WEAK INFANTS

FOR many years scientists and medical authorities have been searching for an apparatus which would preserve life in the prematurely born or weak infants. It has not been until within the past seven years that such an apparatus was constructed which would operate in a successful manner. Heretofore only 15 to 30 per cent. of such infants could be expected to live, now it is safely asserted that more than 85 per cent. of the children thus reared are saved.

Hundreds of years ago it was the custom to wrap such children in sheepskin with the wool adhering, and the peasants of Silesia and Westphalia placed them in a jar of feathers. In England the cot or cradle was put close to the hearth, and it was necessary to watch the fire night and day, so that the temperature might not vary.

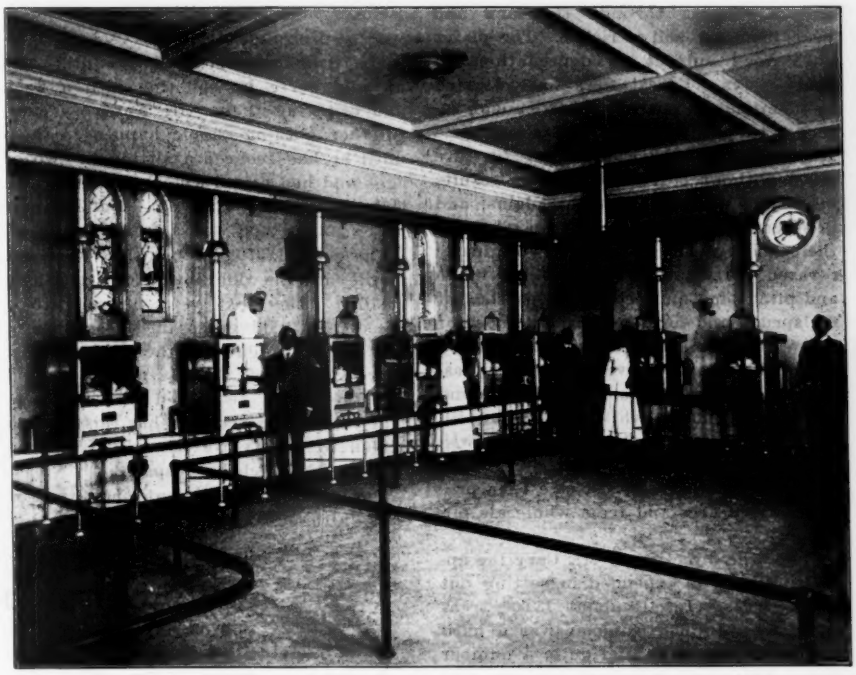
Some sixty years ago Dr. Crede, of the University of Leipzig, sought to effect an improvement on these primitive and unreliable methods. He constructed a sort of box with double metallic sides; the space between these walls could be filled with hot water so as to maintain the desired temperature within the box. The infant, covered with blankets and resting in a basket or cradle, was placed inside. Incubators of this description were, until recently, employed in the Charite hospital of Berlin.

In 1878 Dr. Tarnier, when visiting the artificial couveuses installed by M. Odille Martin at the Jardin d'Acclimation, for the rearing of poultry, thought that he might utilize a similar apparatus in the case of prematurely born children. M. Odille Martin was, therefore, requested to construct a couveuse sufficiently ventilated and large enough to hold one or two infants. This was done, and thus the first incubators were introduced at the Paris Maternity hospital in 1880. They constituted a noteworthy step forward in the right direction, but the apparatus proved only partly successful.

Seven years ago an institution was established in Berlin with the sole object in view of saving these children. The enterprise was a private one, and it has become a paying institution. Every year a reunion is held of all the children that have been nurtured, at which time they are examined—physically and mentally—by governmental authorities, and it is gratifying to know that they have been found to be fully equal to the average of those born under better conditions.

In 1897 the promoters of the enterprise made the first public exhibit in an English-speaking country in London in honor of Queen Victoria's diamond jubilee. There they were successful in saving twenty-seven children, included in which was a set of triplets. These infants received the Queen's bounty and are thriving youngsters today. Since that time a permanent institution has been established in London, which is conducted and managed on the same lines as the one in Berlin.

The incubator at the Buffalo Exposition is a glass case in a metal frame, supported on metal legs. In it is suspended a cot of woven wire, adequately padded. Fresh air is admitted by a large tube from outside the room. This air, first passing through an antiseptic fluid and being filtered through cotton, enters at the bottom of the case and strikes an umbrella-like shield below the cot, and is thus deflected downward till it meets the warm current of air provided by a Bunsen's burner placed outside the case. Inside the incubator is a thermostat, which by its contraction and expansion automatically works a lever outside, lowering or raising a cover on the burner and thus directing more heat inside the incubator or letting it escape outside, according as the inner temperature falls below or rises above the required degree. A thermometer in front registers the degree existing. The foul air escapes from above through an air shaft.



[Photo copyrighted by C. D. Arnold.] MAIN INCUBATOR WARD AT BUFFALO EXPOSITION.

In a large, sanitary room, well lighted, stand about a dozen of these incubators, occupied by premature or weakly infants, swathed in German fashion. These infants are sent by the physicians of Buffalo and handed over to the care of the institution. They are weighed, properly clothed and placed in the incubator. They are generally under five pounds in weight on admission. A staff of wet nurses is kept in the establishment, all of them being medically examined and carefully selected. They live in the building, and their diet and regimen are carefully regulated.

The babies are taken out of the incubator every two hours to be fed. Those that are too weak to feed in the natural manner receive sustenance through the Gavage spoon, which conveys the milk through the nostrils to the passages leading to the stomach. As soon as they are strong enough, they, too, are given over to the wet nurses. Each child is weighed before and after each feeding.

Most of the babies lie with eyes closed and practically the only sign of life is the occasional flutter of a tiny hand. The boys have distinguishing ribbons of blue and the girls of pink, in accordance with European custom.

Back of the incubator room is a model nursery, and a minature elevator takes the infants to the upstairs quarter to be fed. There is the tiny bath tub where even the littlest baby is daily tubbed, the scales where they are daily weighed, the hanging cribs where they are laid after a two months' course in the incubator. Every article is beautifully, artistically clean. There the medical directors, Drs. Schenckheim and Coney, live and the nurses have their apartments.

Those at the exposition are not from institutions, as generally supposed, but from private families that in many cases are possessed of large means, and the names of the little patients are kept carefully from the public. All are from Buffalo or places near, as such infants have not sufficient vitality to endure traveling. Quite the "show baby" is a wee African, whose weight on entering was two and a half pounds.

It is the intention of the company making this exhibition at Buffalo to establish institutions such as those in Berlin and London in the principal American cities.

In Prussia there are at present fifty-eight persons who have an income of over $250,000 a year.

Marion Crawford, the novelist, was 47 years old on Aug. 2. His first novel, "Mr. Isaacs," was published about twenty years ago.

TWO NOVEL MAINE ENTERPRISES

TOWN RAISES TREES

BRUNSWICK, Me., is probably the only town in New England that is conducting a regular system of foresting. The town owns many acres of plains land that for years has been of no use except for an annual crop of blueberries. About two years ago, at the suggestion of Austin Cary, there was a meeting of the village improvement society and steps were taken to have a sum appropriated by the town for the improvement of this land. A great deal of interest was aroused and the town voted $100 to devote to planting and other ways of assisting the growth.

The Brunswick plains, as the land is called, contain about 800 acres. The soil is light and is for the most part unsuited for farming, yet there are several small brooks running through the land and near them the soil is richer. The plains have been subject to depredations in many ways. Forest fires have started in them and no one has taken enough interest to put the blaze out when once started. Trees have been cut for fire wood without regard to size or results on nearly every part of the plains, and in several places squatters have taken up their abode. The plains were originally covered with a mixed growth of white and pitch pine and occasional patches of fir, spruce and hard woods, but most of the white pine and other woods that are easily killed by fire have died and at present pitch-pine predominates. Around the brooks many white pine are still found and there is also a heavy growth just outside the town land on private property, where the trees have been protected from fires and from wholesale pilfering.

Under the direction of Mr. Cary the appropriation was expended in setting out young trees. In all about 15,000 trees were set out. The summer was a hard one for young trees and quite a number died. This year another appropriation of $100 was made and this time Mr. Cary went to work a different way. He had a number of furrows ploughed through the more open spots and in these he set out 6,000 young white pine trees. With very few exceptions all these trees are alive and doing well, and but for fire they have now passed the danger point. These young trees have been set out near groves of pitch pine, so that when the latter seeds the young trees of the two kinds will grow up together and thus assist the growth of both, as the trees grow better when they are fairly thick. At present about 21 acres have been covered this way.

But the most interesting part of the work is outside the town property on the land of Gorham Purington, a farmer. Here is a nursery of young trees raised from the seed. About 12 pounds of seed were gathered and sown in a bed near a good sized stand of white pine. The seeds have sprouted and are growing finely. The young trees are now one or two inches high and by another year will be ready to transplant. The beds are covered with lath racks, to keep off the heat, but they have plenty of light.

In this way Brunswick is slowly gaining a forest of white pine trees that in the future will be a source of revenue, besides making the plains much more attractive.

Mr. Cary has put a great deal of time into the work. He is an expert in forestry, having been connected with the Berlin Mills Company in the capacity of forester for a number of years.

RAISING WILD GEESE FOR DECOYS

F. W. Thompson, of Salisbury Cove, near Bar Harbor, Me., raises wild geese in captivity. He supplies decoys for hunters and is at last satisfied with the results of his experiments, which have covered a period of sixteen years. He can breed the wild birds almost as well as the domestic geese.

Mr. Thompson secured his first trio of wild geese by shooting into a flock and crippling them. He was very careful that nothing should happen to them until he had secured a sitting or two of eggs and had raised a flock of wild geese that would stay with him. But his first year's experience was a failure.

The geese laid eggs, but they were not fertile and he did not secure a single gosling. The next year he sent to a breeder of wild geese in Massachusetts and bought a gander, the bird costing, express included, $16. It proved a good investment, as he raised nine goslings that year, and since then has raised from fifteen to twenty-five annually from the three pairs which he keeps.

The wild goose lays but one litter of eggs, although she will sometimes lay three or four extra eggs if not allowed to sit. When the goslings are about four weeks old the end of the wing on which the flight feathers grow must be removed to the first joint.

"I believe," said Mr. Thompson, "the instinct for flight or migration is so strong that even after being bred so long in captivity they would leave either in the spring or the fall. It is interesting to see the geese change their location on the farm. In the fall they will locate at the south end of the farm buildings, and in the spring they will move to a point north. It is the same way when they fly, as they often do, sometimes a mile or so away, but they always go north in the spring and south in the fall.

"I have never lost a bird by having it leave the place, but have lost some thro' sportsmen shooting them accidentally. They are very hardy and live out of doors the year round. They seem to enjoy the storms, and will always sit head to the wind. I shoot a great many wild geese each year that alight near my place, called down while passing my flock.

"There is nothing better for a decoy than a wild gander. He is taken to a place where wild geese are in the habit of going and with a string tied to his leg he is allowed to swim out from shore. Should a flock of geese come anywhere near he is almost sure to call them down. The hunter, who should be in hiding in a secluded place near by, will have a chance to test his marksmanship to good advantage."

Nearly all the geese raised by Mr. Thompson are sold for decoys or to private or public parks. He has sent a great many to New York City. They are very handsome, the gander, when fully matured weighing sixteen pounds and the geese twelve pounds.

* * * * *

TWO-COLOR PHOTOGRAPHY

A NEW method of photographic printing upon paper in two colors has lately been devised by M. Bolle. By this means images may be printed side by side in different colors and an agreeable effect thus produced; it is especially applicable in the case of a central image surrounded by a border of a second color. One of the images is printed from a photographic negative and the second from a negative prepared from a hand design. The method is based upon the combination of the ferro-prussiate (blue print) and the bichromated gum process, and gives a blue image combined with another whose color may be varied according to the taste of the operator. To obtain the blue image the paper is sensitized by a mixture of the two following solutions:

A. Citrate of iron and ammonia, 15 parts or 15 grains. Water, 50 parts or 50 minims.

B. Ferricyanide of potassium, 8 parts or 8 grains. Water, 40 parts or 40 minims.

These solutions, prepared and filtered, may be mixed in advance and kept in yellow bottles, but it is best to mix at the time of using. The image is strongly printed and developed by washing in water till the whites become pure. The second image may form, for instance, a border for the blue image. To obtain it a plate is first prepared by exposing an ordinary gelatine plate to daylight and developing it until it is entirely black. The design to be reproduced is copied or traced upon tracing paper and transferred to the plate by impression paper. It is then engraved through the film with the point of a needle, giving a negative in black and white. To print this design the border of the blue image is sensitized by brushing over it a thin and even layer of gum arabic, 40 per cent. solution, to which is added a sufficient quantity of the color decided upon. When this layer is dry a sensitizing solution of bichromatic of potash (10 per cent.) is applied in the same way. The printing is carried out as usual and the image developed by washing in cold or lukewarm water. The Scientific American thinks this process may be modified in different ways and will find many applications; if desired, the center of the image may be printed by the latter method and the margin in blue, or different images may be printed side by side.

JEWISH COLONIES IN PALESTINE

PROGRESS BEING MADE BY THE ZIONIST MOVEMENT TO POPULATE THE HOLY LAND WITH JEWS

THE report that Dr. Theodore Herzl, the head of the Zionist movement, is meeting with considerable opposition in seeking to obtain special privileges from the Sultan for the Jewish colonists in Palestine, calls attention anew to the extent of present operations. Dr. Herzl's original aim, as expressed in his book, "Der Judenstaat," (The Jewish State), was to purchase Palestine from Turkey for the purpose of building a Jewish state under the suzerainty of the Sultan and the protection of the powers. He mapped out a system of government, a national bank, a military organization and even suggested a flag—white containing seven gold stars.

The book created a sensation, and when Dr. Herzi called a congress of Zionists to meet at Basle, Switzerland, 400 delegates responded. Dr. Herzl's plans were considerably modified. The idea of an independent state was temporarily abandoned as premature and liable to injure the cause.

But the visionary scheme had become an idea, and with his usual pertinacity and perseverance, the Jew set about to materialize the dream of Zionism. The first essential to ultimate success was money. Accordingly the Jewish Colonial Trust, Limited, was formed, with $10,000,000 capital and head offices in London. There are 2,000,000 shares of $5 each, and about $1,000,000 has been paid in—not by the rich, but by the poorer classes. In this country 20,000 shares have been taken by almost as many subscribers. The trust was established not merely to furnish transportation for emigrants, but to start factories, build railroads and telegraph lines, and to help the colonists to a state of financial prosperity.

In this country the movement was taken up in 1898, but because of the war with Spain little was done. The New York Sun reports that at the first convention there were fifty delegates; at the one just held there were represented 12,000 members, 148 societies from twenty-eight states and eighty-nine cities, including Manila, where there are forty-five Zionists in the United States Hospital Corps, and Matanzas, Cuba, where eight troopers of the Second Cavalry are interested in the movement.

How far the settlement of Palestine has progressed is best shown by reports of the various settlements. These settlements occupy about sixty square miles in Judea, Galilee and Bashan, as the eastern trans-Jordan portion of Palestine is called, or 1 per cent. of its entire area.

The oldest settlement is at Mikveh Israel, near Jaffa, containing 600 acres. This colony is the agricultural centre of the Zionists. An agricultural school with 100 pupils and fully equipped with the best American implements, is located there. Five miles to the south is Rishon Zion, with 2,000 acres and 500 settlers. Their principal occupation is the raising of silkworms. There are 20,000 mulberry trees, wells, a fine school, a synagogue, a library and a cask manufactory. In the last are made the casks in which the celebrated Carmel wines are shipped. The factory is lighted by electricity generated on the premises, and all the machinery is modern. Each family has a two-story house.

Another five miles to the south is Wadi-el-Hannin (the Dale of Roses), containing 670 colonists. The principal industry is the cultivation of grapes. Adjacent is Rehobath, consisting of 2,500 acres and 250 settlers. Ekron, further inland, contains 1,000 acres. Its 250 colonists raise wheat, fruits, olives and silk worms. Gadrach, to the west, has 900 acres, in which are 2,000 selected burgundy vines. Artuf, at the foot of the Judean mountains, contains twenty families, while Kastinia, in Philistia, east of Ashdod, support 120 families of Bessarabian Jews on its 1,200 acres.

Petakh Tikneh, north of Jaffa, is a more important colony. It has 750 inhabitants, who till 3,500 acres, raising oranges, lemons and various flowers (especially roses and geraniums) for essential oils. El Heiderah, north of Tantura, contains 6,000 acres. It is settled by Russian exiles. At the time of their arrival there 7700 acres of their colony were swampy marshes, and in consequence, malaria and typhoid threatened the success of the undertaking. Baron Edmund de Rothschild, on learning of this state of affairs, drained the swamps and planted 50,000 eucalyptus trees, so that at present the health of the colonists is not endangered. Tantura itself contains a large glass factory.

Zikron Yakub, on the slope of Mount Carmel, contains 5,000 acres, supporting 2,000 Roumanian Jews, mainly engaged in grape growing. This settlement is surrounded by others at Shefaya Ummet Tut and Umm el Jemail. Rosh Pinah, another of the more important colonies, has sixty houses, fine gardens, three springs, half a million vines, 80,000 mulberry trees and a silk factory employing sixty hands. Yesud Hammalah, near by, is a Polish settlement. It contains 900 acres, the occupation of its settlers being the growing of flowers for essential oils, bee farming and silk weaving. To the southwest, just north of Safed, on the summit of the range of Upper Galilee, is Ain Zeitun, at which place there are 300,000 vines. Other colonies are Mishmar ha Yarden, Mechanayim, Metulla, Beni Yehudah, and Sahem el Janlan (in the trans-Jordan).

Everything in these settlements is up-to-date. The best machinery is installed and electricity plays a prominent part in the mechanical life of the colonies. The schools are essentially modern. Mathematics, literature, geography, Arabic and French are taught. Hebrew is spoken, but modern words, such as locomotive, electricity, etc., have been introduced in Greek form. Another interesting feature of Zionistic life is its mounted militia. Like the Arabs, most of the colonists ride and shoot well. A number of them have been formed into an irregular cavalry corps, mounted on Arabian horses and armed with magazine rifles. They dress in white and make an excellent showing.

The Zionists are now using their utmost endeavors to obtain from the Sultan a charter guaranteed by the powers, which will give them the rights of colonization on a large scale. The Sultan has been particularly kind to the Jews in his dominions, for they are racially descended from the same parent stock as the Turks and Arabs.

THE PRESIDENT'S NEW WAR MAP

BY JOHN ELFORTH WATKINS JR.

THE most remarkable map of the world, and in the world, is shortly to be installed in that unique sanctum, the war room of the White House. It is twenty feet long by eight feet wide, and the parallels and meridians which form its projections would cover 2,000 feet if placed end to end. It has required four months of hard work to make it. All of its lines and tints have been painted in by hand, yet such skill has been employed that it appears to be a gigantic lithograph.

Upon this colossal chart President McKinley and his successors will study all future wars and diplomatic conflicts exciting the world. Over its face, as though it were a great chess board, miniature representations of the armies and fleets of the world will be moved, while skilled geographers and cartographers will continually alter it to represent changes of boundaries, new cable lines, interoceanic canals and whatsoever may alter the political complexion of Mother Earth.

No drawing board in the world would hold the paper on which this remarkable map was made. Hence it had to be drawn upon two immense strips of paper, which are now being pasted together. The seam thus necessitated will run lengthwise with the finished sheet, but will be so neatly effected as to be invisible. The heavy paper is backed with thick cloth, such as will conveniently receive the flags and miniature ships stuck into it. It will exactly fill the west wall space of the war room. Beneath the cloth backing will rest a mat of compo board, which is composed of small pieces of wood cemented together upon a paper foundation, in such manner as to prevent warping or bulging by contraction or expansion. A handsome frame will surround the entire map. The work of installing the map was commenced as soon as the President departed on his summer vacation. When he returns it will contain the exact military status of the world marked out for the hour he first sets foot in his war room.

Facing the great chart, Mr. McKinley can see every point of strategic importance upon the entire face of the earth. North and South America loom up in the center of the great rectangle. To the right, and therefore to the east, appear Europe, Asia and Africa in their entirety, except for a small corner of Siberia. To the west is shown the broad expanse

of the Pacific, Australia, Oceanica, and a repetition of nearly the entire eastern coast of Asia. This repetition is made to again show the Philippines, which also appear at the extreme eastern end of the map. Thus the President can trace the progress of ships all the way to Manila by either the Atlantic or Pacific route. He can follow them by way of the Mediterranean, the Red sea, the Indian ocean and the China sea, starting from New York, or, embarking from San Francisco, he can indicate their progress by way of Hawaii and Guam. In neither voyage will his miniature ships run off the edge of the map.

Fourteen colors are employed to indicate the political divisions of the world. There are eleven distinct colors, each representing territory of one of the eleven colony-holding powers. Countries without detached possessions are designated each by one of three other colors, distributed about. To make the many collected colors harmonize, great artistic judgment had to be used.

The colors were applied to the great map with an airbrush, the hand of the most skilled map painter in the world not being sufficiently uniform in touch to effect a tinting which might appear perfectly homogeneous when so widely distributed. The airbrush used was a sort of fountain pen arrangement, through which the paint, fed by reservoir and tube, was emitted by compressed air pressure and fell upon the paper in the form of a delicate spray.

Over a thousand little flags and emblems bearing flags are being made to represent the positions of our army and navy alone. It will take one man a week to put them all in place, after the map has been mounted and before the President returns to view it. Each flag is a square of parchment of about three-quarters of an inch dimension, fastened with red wax to a long steel pin with a white glass head.

A blue flag stuck through a cardboard ship will represent each vessel of our navy and will have the latter's name neatly lettered thereon. Each army transport will be represented thus, with an addition of a blue and white flag surcharged in black, with the number of officers and men aboard. Each regiment of infantry will be designated by a white flag, cavalry by a yellow, artillery by red, engineers by diagonal red and white, signal corps by white with red center and hospital corps by a red cross. Each general and admiral will be designated in the war room by a flag bearing his name. It will be placed upon the map with any regiment or fleet which he may happen to command in an engagement. Each of the foreign armies and navies will be similarly represented.

All naval stations of the world and ports where there are docks sufficiently large to repair our war vessels are shown on the map, also all coaling stations of the world's navies. All of the sixteen submarine cables crossing the Atlantic, the entire series of new cables wiring together the Philippines—in fact, every ocean cable line in the world—are shown. The great Trans-Siberian railway is indicated, because of its great military value. Similarly are shown the great railway lines of China. Fixing his eye upon this interesting war chart, the President can trace at a glance the inter-continental lines which transmit not only the accessories, but the intelligence of international struggles.

The great map will be absolutely up to date, geographically, to the hour when it is put in place. It is believed to be the only map in the world, large or small, which today shows in exactness and completeness of detail all the political subdivisions of the newly reorganized world. It teaches many interesting lessons which will not be found in our school geographies for several years at least.

Some eccentricities and anomalies of up-to-date geography were unearthed in the compilation of this map. Far down in the South Atlantic was found the Sandwich group—not the Hawaiian islands—of nine islands, which could not be colored because they have no owner. This group is the only No Man's Land remaining in the accessible seas. Another discovery was that Marcus island, southeast of Japan and northeast of the Ladrones, although regarded as our territory prior to the war with Spain, was claimed by Japan that year and is now shadowed by the flag of that aggressive oriental empire. The map maker was likewise puzzled when he came to the coloring of the Nile valley, south of Khartoum. Where Egyptian sovereignty ended and British sovereignty commenced was the problem. Hence the colors of the two powers were skillfully and gradually blended into each other.

The war room was the conception of President McKinley upon the outbreak of the late war. It is a small apartment in the southeastern corner of the Executive Mansion, the middle chamber between the President's office and anteroom. It had been formerly occupied by Mr. Porter, secretary to the President. It contains a switch-board connecting twenty wires by which the President can be placed directly upon the circuits of all the telegraph companies of the United States, the great French and English cables, and therefore with the entire civilized world. A cable box with fifteen telephone wires places the room in communication with the desks of his cabinet members, with both houses of congress and with the supreme court.

A President of the United States may now actually assume the duties of commander-in-chief of his army and navy, a power vested in him by the Constitution. The combination of direct cable communication with forces in operation and this graphic representation of the whole world's possibilities as a theatre of operations laid graphically before him, even to the detail of movable fleets and armies, alone make assumption of such responsibility possible.

WHERE MAHOGANY IS FOUND

THE mahogany hunter is the most important and best-paid laborer in the Central and South American service, for upon his skill and activity largely depends the success of the season. The trees do not grow in groups, but are scattered promiscuously through the forest and hidden in the dense growth of underbrush, vines and creepers, and it requires skillful and experienced woodsmen to find them. To fell a large mahogany tree is one day's task for two men. On account of the thorn-like spurs which project from the trunk at its base, scaffolds are erected and the tree cut off above these protuberances, which leaves a stump from ten to fifteen feet high, thus wasting the best part of the tree. After trimming the tree of its branches it is hauled by means of a crude truck, with oxen as motive power, to the bank of the river. There the logs are collected and made ready for the floods. On the longest rivers these begin in June and July and on others in October and November. The logs are turned adrift and when they reach tidewater are caught by means of booms. From the boom the logs are taken to the "embarcadero" and prepared for shipment. A tree makes from two to five logs, measuring ten to eighteen feet in length and from twenty to twenty-four inches in diameter after being hewn.

There is a great range in the value of mahogany timber. The poor grade of short stock may sell as low as 50 cents for 1,000 feet, while fancy material, used in the manufacture of tops of counters, may be worth $3.50 for 1,000 feet, or even higher. Previous to the war in Cuba much mahogany was shipped from the island to the United States, and the trade has been reviving within the last two years. The finest quality from this source is called the "San Jago" and is used in the manufacture of fancy furniture and for the interior work of houses. The price of this variety, made on an inch basis, ranges rom $140 to $165 for 1,000 feet. Fine hard Mexican mahogany, which is one of the most satisfactory kinds for fine furniture or interior work, is sold according to the grade. It is a hard wood, of good color, and finishes well. The "firsts" and "seconds" in this class of stock are sold for about $160 for 1,000 feet, but when it is selected it is worth from $170 to $200 for 1,000 feet. "Commons" sell at from $110 to $145, and "culls" (lowest grade) at from $60 to $90. The soft Mexican mahogany is not desirable, and, in all grades, is worth from $20 to $25 for 1,000 feet less than the hard variety.

From being an article of luxury, and used only for expensive work, mahogany is becoming one of the stable finishing and furniture woods of the United States. It is not a cheap wood and undoubtedly never will be, but even houses of moderate cost may contain one or more rooms finished with it, and as a furniture wood it has become a standard. It is reported that one of the leading furniture factories of Michigan will use this year mahogany for 80 per cent. of its product, and other furniture makers throughout the country are making medium-priced goods of this material. Its use as a veneering is extensive.

ACHIEVEMENTS OF ASTRONOMICAL SCIENCE

STUDYING PLANETS WHICH ARE INVISIBLE AND EXPLANATION OF BLAZING STARS

By PROFESSER SIMON NEWCOMB

NOT long ago I stated in the Washington Evening Star that no triumph of the human intellect is more wonderful than the discovery of planets revolving around many of the stars. If these bodies could be seen with a telescope, there would be nothing wonderful in their being found. But they are generally, so far as we know, entirely dark; at least, they send forth no light that the human eye could discern by the most powerful telescope. They are and must forever be invisible. How, then, is their existence made known? By their attraction on the stars around which they revolve, and which they cause to swing first to one side and then to the other. But this swing of the star is so small as to be entirely beyond the power of detection by the most delicate eye and the most powerful telescope. To all appearances the stars remain absolutely at rest, except for the slow, straightforward motion which we find many of them to have when observations on their positions are extended through years or generations. If we cannot see any motion, how do we know that the stars move? This is the real wonder. It is done by analyzing the light which the star sends to us. It has long been known that light really consists in minute vibrations or wave-like motions in an ether which fills all space. There are from 10,000 to 100,000 of these waves in the length of a single inch, and yet they travel forward so rapidly that they would encircle the earth seven times between two beats of the clock. Small though they are, each little wave has its crest, as have the billows of the ocean. On the latter the distances between two successive crests may be more than the length of a ship, or less than that of a ship's boat. So it is with light; although countless millions of millions of waves pass in a single second, some vibrate more rapidly than others.

ANALYZING THE LIGHT OF A STAR

By the aid of the spectroscope the astronomer analyzes the light of a star, and thus finds the length of certain of the waves which it sends toward us. If it is moving in our direction these waves will be a little shorter than when it is moving away from us. And thus, it is said, that by measuring the length of the light wave which a star emits, it can be determined whether the star is increasing or diminishing its distance from us. When these most difficult and delicate measures were made upon a number of the brighter stars it was found that some of them changed their motion to or from us. For a few hours, or perhaps a few days, a star would be moving toward us, then it would slacken its pace and move away from us, to return toward us again. Thus it would vibrate backward and forward, as it were, like a swinging pendulum. As a matter of fact, we know that the motion is more likely to be around and around in a circle. But this circle, though millions of miles in extent, is so small as to be quite invisible at the enormous distances of the fixed stars. The motion of the stars which I have described being made known by the light can be as well determined upon a star at the most immeasurable distance as upon one in our immediate neighborhood. And thus it is that these motions are made out when the telescope fails to show any movement whatever. They can be caused only by the attraction of invisible but massive bodies revolving around the stars as the planets revolve around the sun.

CALCULATING THE MOTION OF A WORLD

So exact have these measures been made in recent times that the form of the orbit of a dark body can, in some cases, be calculated with more or less exactness. And thus it happens that if there are any inhabitants on these planets our astronomers here on earth could tell them more about the motion of the world on which they live than the most civilized people a few centuries ago knew of the motions of the earth on which we dwell.

The most recent researches show that there is an immense variety among the stars, especially as to their actual brightness. Of course a star of any given brightness will look fainter the farther it is from us. Thus it was, in former times, supposed that the brightest stars were nearest us. But this is not always the case.

It is true that Sirius, the brightest star in the heavens, is among the nearer ones; about twice as far as the nearest star known. But the next brightest is Canopus, which never rises in our northern latitudes, though it may sometimes be seen in the gulf states. It is there visible low down near the southern horizon some time during the winter evenings.

Gill, at the Cape of Good Hope, made a long series of the most exact measures on the position of this star amongst those scattered around it, with a view of determining its distance. The result of his work showed that this distance must be immeasurably great. Had it been only ten million times the distance of the sun he would have found it out. The result of his work is that this star must be thousands and perhaps tens of thousands of times as bright as our sun. If our earth revolved around it at the same distance that it does from the sun everything on its surface would immediately melt with fervent heat.

WONDERFUL BLAZING STARS

There are a number of cases recorded in history of new and very bright stars blazing forth in the heavens. This, however, occurred very rarely. Sometimes two such stars would be seen in the course of a century. Frequently several centuries have elapsed without anything of the kind being recorded. But in recent times, when people watch the heavens more carefully, it is found that such an occurrence takes place every year or two. Generally, however, the star is so small that only a trained expert observer would have noticed it among the thousands of its companions.

Very wonderful, therefore, was the blazing out, so recently as last February, of the most brilliant star of this kind whose appearance has been recorded during the last two hundred years. It is now well known under the name of Nova Persei, or the new star in the constellation of Perseus. It has not yet been determined that any star visible in the most powerful telescope existed in the place where this one appeared. Yet it blazed up until it was the brightest star in the spring sky except Sirius. Then it gradually faded away, and has since become invisible. Whether it will disappear entirely we do not yet know.

No astronomer now doubts that these stars existed before they blazed up in this small way, only they were so much smaller as not to be noticeable. A most interesting and important question is, what was the cause of such an outburst of light? Is it possible that our sun may increase its light and heat in the same way? Even were this possible, the chances for such an occurrence would be too small to cause concern to the most timid person. Out of a hundred million stars scarcely one in a year meets with the accident. If our sun were as liable to the accident as any other star we should probably have to wait millions of years before it occurred.

A POSSIBLE EXPLANATION

The actual cause of such an increase of light is quite unknown to us. Perhaps the most plausible explanation is that one star fell into another. But in the present state of our knowledge this is little more than a surmise. The wisest astronomer acknowledges that he does not know the cause of the outburst.

What gives most color to the idea of a collision is that the most recent researches on the nature of the stars show that they are very different from each other in their physical constitution and density. Many of them are little more than bright bubbles of heated gas, lighter and thinner than air, but enormously compressed by the weight of their superficial parts which bear upon the interior. If such a compressed gas were struck by a moving star the result would be an explosion like that of a bombshell. This would account both for the rapid rise of the star's brilliancy and its slow fading away.

Additional plausibility is given to this view by the fact that no such star has ever been known to blaze out more than once. Whether, when it fades away, it sinks back into its former insignificance, no one knows. There is only one case in which a star previously known and recorded thus burst forth. That was in 1866. In this case the star did sink to just about its former brightness.

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VOTING BY MACHINE

VOTERS as well as politicians visiting the Pan-American Exposition have found the voting machine to be one of the most interesting exhibits. Those who examined it critically declare its only defect to be making the voting of a straight ticket easier than the voting of a split ticket.

The machine cannot make election officers honest, but it will give a fair count of votes if there is one honest man in the polling place. Moreover, it will give the count accurately the moment the last ballot has been polled, and that is a matter of no small importance. In the Presidential election of 1900 the result in Buffalo was accurately known within forty-five minutes after the closing of the polls. It was known at once in each polling place; the forty-five minutes being consumed in adding up the returns from the districts.

The machines cost $500 each, but they pay for themselves in a few years by reducing the cost of printing tickets and by reducing the required number of polling places with their attendant expenses. The method of voting is so simple that even the illiterate voter can be taught how to vote a straight or a split ticket, and schools for the instruction of such voters are established wherever the machines are used.

The voter enters a booth. His first duty is to draw about him a curtain, which conceals from view his further operations. The curtain is attached to a lever, and in closing it about him the voter sets the machine for operation. In front of him he finds the party tickets, each with its emblem (for the illiterate voter) and the names of the candidates duly numbered. In addition there is a column in which he may write the name of a candidate not otherwise presented. If he should desire to vote a straight ticket, the process is very simple. He moves a single lever at the head of the Republican, Democratic or other column, and in the act of withdrawing the curtain votes the ticket he has selected. It is instantly recorded, publicly in the total number of votes cast, secretly as to the ticket voted.

If, however, the voter desires to vote a split ticket, the process is more complicated. Closing himself in as before, he pulls down the lever, say, of the Republican column as the basis of the vote, and selects No. 8, the candidate for District Attorney, to whom he is opposed. When he has pulled down the main lever he has also pulled down a series of small levers attached to each candidate's name on that list. Not desiring to vote for No. 8, he raises up the small lever opposite the number and pulls down any other lever on the same line. If none of the candidates suit him, he pulls down a lever on the blank column and discloses a paper slip, on which he can write the name of the man for whom he desires to vote. Thus, he can make up a ticket to suit himself, but he cannot possibly make up a ballot that is void. When he pulls down all the levers on the Republican ticket and lifts up No. 8, only the No. 8 levers in other columns are released, the others being locked, and when he pulls down any other of the No. 8 levers all the others on that line are locked. Thus, he cannot, if he would, vote for two men for the same office, unless the law allows him to do so. He can manipulate the levers as much as he chooses, changing his ballot as often as required, for it is not actually voted until he withdraws the curtain to retire. For this reason he cannot vote twice, except by collusion of the election officers and spectators, for it is the act of withdrawing the curtain that casts the vote, and he would have to expose himself and again cover himself in order to vote twice. Mechanically the machine appears to be perfect. It could be beaten by an election board that would deliberately allow a man to vote more than once, but not under the supervision of a board that included one honest man. So, also, the recorded returns could be falsely reported by a dishonest election board, but the machine itself would make an accurate account of the votes polled.

The sole objection to it is that it makes the voting of a straight ticket much easier than the voting of a split ticket, but that could easily be remedied by requiring the voter to pull down the small levers for each candidate for whom he desires to cast his vote. The illiterate voter is at no disadvantage provided he can recognize a party emblem or can count. He can easily be instructed what to do. It is to be said in favor of the machine that it has actually been employed with marked success in several New York cities, including Buffalo, and that it has met every requirement as to simplicity of operation, speed and accuracy.

AN EXPERT OPINION ON AMPUTATION

GENERALLY ACCEPTED BELIEF IS PROVEN TO BE NOT CORRECT

GEORGE E. MARKS, expert in Prothesis, is strongly of the opinion that the loss of limbs does not necessarily shorten life. The common belief, shared by the medical profession as well as the laity, is that any serious dismemberment will mean a loss of ten years or more of life, this being attributed to the shock that the nervous system receives by the injury and the amputation.

Continuing, the expert says, in his communication to the Boston Herald: Conversance with more than 60,000 cases that have come within my personal knowledge, however, allows me to refute this popular fallacy. I am convinced that, all things being equal, dismemberment of the human body plays no part in the shortening of life. Records dating back for nearly half a century reveal the fact that in no case has death been directly ascribed to the loss of limb; that very few have been afflicted with pulmonary or cardiac diseases, and those who succumbed to these diseases were affected before their limbs were amputated. In fact, it is a common occurrence to meet cases of badly maimed men who, although crippled in childhood, youth or early manhood, have passed their threescore and ten and who still enjoy most excellent health. Indeed, without danger of overstatement, investigation of these thousands of cases persuades us to believe that amputations actually enhance vitality, making it not only probable but positive that on account of such amputations the lives of the subjects have been prolonged and rendered less subject to disease.

Instances are numerous in substantiation of this belief, many of them are of national and international reputation. Among them are Speaker Henderson of the House of Representatives; Count Okuma, prime minister of Japan, and statesmen like the Vicomte de San Roman of Mexico; Donalson of Australia; Madden of New Zealand; Heineman of Denmark; Nikorowicz of Austria; Low of Hawaii; Diaz of Argentia; Gen. D. E. Sickles of civil war fame; Wade Hampton, Gen. Wager Swayne and others prominent in state, legal, military and industrial pursuits—men deprived of one or more of their limbs, and still attaining their full allotment of years in full vigor, with the promise of more than fulfilling the Biblical portion. In many instances, so stimulated by dismemberment have the remaining faculties become that insanity among maimed men is almost unknown, and cases of cripples committing suicide are so rare as to make content with life almost an ironbound rule.

Persons who lose their legs become very powerful of arm, large in chest and heavier in girth, while those who lose their arms are correspondingly stronger of lower limb. Not only stronger, but more skillful, as witness the wonderful armless painter, late of the Royal Gallery of Brussels, who painted daily there, making copies of the old masters with challenging fidelity, mixing his colors and wielding brush and mallstick with his feet and toes. A reasonable explanation may be found in the hypothesis that the removal of any part of the body lessens the demand on the vital forces and permits the supplying reservoirs to contribute more abundantly to the remaining members.

On the whole, I think it safe to say that there is generally better physical and mental condition and a consequent freedom from despondency on the part of the maimed. By comparison, the rheumatic, dyspeptic or gouty subject calls for the cripple's sympathy. Nature, with her usual generosity, compensates for our every misfortune. Many of those who are apparently most afflicted really need our commiseration the least. Their minds and dispositions have already been prepared by nature to bear their misfortunes, and they dislike to have others notice or mention them, much less to shed tears over that which they so little regret themselves.

A PLEA FOR THE ALL-AROUND MAN

EDWARD S. PARSONS, of Oxford, England, recently took occasion to reply to a staff-editor of the Outlook, who had denounced the all-around man and who had said that while there had once been a place for him there is one no longer. Mr. Parsons says that there is not a successful college president today who is not an all-around man. What is more, a man cannot be a successful college president, or a successful pastor of a church, or a successful missionary, or successful in any human activity that requires tact and adaptability, without being an all-around man. I recall, as I write, passages from the, to me, pathetic letters of one of my college friends, the highest-stand man in his class, now a missionary in India, letters in which he tells of his life of kaleidoscopic variety—teacher, preacher, pastor, physician, supervisor of famine orphans, architect, mechanic—and then I repeat the fateful word of the Spectator:

"There is no room for the all-around man." Perhaps the Spectator is able to be what so many other men long to be and cannot be, a specialist. If he is, I wish he could take for a week the place of my missionary friend. If he is ever placed in such a situation, God help him if he is not an all-around man!

Two things about this much-discussed subject should never be overlooked. The world of today wants the specialist, but only the specialist with a wealth of varied experience behind him. It has some place, perhaps, but assuredly a very small one, for the man who—to quote President Wheeler's words—is "as sharp as a needle and equally broad." Again, it must not be forgotten that many a man is today sacrificing ambition and deep intellectual longings because he knows God is calling him to be an all-around man, is not letting him do the one thing he would selfishly like to do.

WEALTH OF PHILIPPINE FORESTS

AN agent of the forestry division of the government has been investigating the condition of forests in the Philippine islands. He finds that the public forest lands comprise from one-fourth to possibly one-half of the area of the Philippine islands—that is, from 20,000,000 to 40,000,000 acres. There are fully 5,000,000 acres of virgin forest owned by the government in the islands of Mindoro and Paragua.

Among other things he says: There are 396 tree species mentioned in the present forestry regulations, and we know of fifty more growing in these islands, and each week we learn of still other species. It is safe to state that the number of tree species found in these islands will be nearer 500 than 450, a great majority of these undoubtedly hard woods. The edges of the great forests have been scarcely cut away and fifty valuable hard woods have been given to the world, the full value of which species has not been demonstrated as yet.

"There is a great variety of valuable gum rubber and gutta percha trees, but the trade has been ruined by the Chinese in their efforts at adulteration and other fradulent practices. We have a list of seventeen dye woods, the revenue from which, if properly exploited, should pay the cost of the forestry service. A book has been written by Tavera on the medicinal qualities of the native plants, many trees being mentioned as possessing valuable medicinal qualities.

The ylang ylang tree abounds here, its blossoms producing an oil which is the base of many renowned perfumes. Quite a revenue is gained by those owning the trees. The west slope of the island of Romblon is a mass of cocoanut palms from the water's edge to the mountain top, every tree bringing in a yearly revenue of from $1 to $2, and when it is realized that 400 and even 500 such trees may be grown on an acre, one is struck with the wisdom of that former commander of Romblon who insisted upon such extensive planting of these trees. In all parts of the southern islands these trees seem to grow without any effort or care.

Good stone roads have made the German forest lands worth today an average of $181 (gold) per acre, and these same lands with standing timber less in quantity and quality than we find at present on many large areas in these islands. There will be some difficulty in the construction of roads in such places as Cagayan, Mindoro and Paragua, but these difficulties can be overcome. Stone is plentiful and available, but labor is scarce, and such as we have is poor and uncertain. This latter will be the one great difficulty. When that is solved, engineers and money will make the Philippine forests yield a revenue that is undreamed of today by the residents of these islands.

The Health Boards

have done the cities grand service by their efforts to secure cleanliness, but the dust of the streets is still laden with disease germs which collect on our clothing and would be absorbed by the skin if it were not for the daily bath. The simple use of pure water is not enough to rid the skin of these impurities. Sulphur destroys disease germs, and as combined in

Glenn's Sulphur Soap

a disinfecting, cleansing soap is produced that has stood the test of years in purifying and healing qualities. Be sure and get

Glenn's Sulphur Soap

The daily use of this soap promotes **health.** For sale by druggists generally.

Pike's Toothache Drops Cure in One Minute.

LEARNING HOW TO SWIM

EVERY boy and girls wants to learn to swim and parents are generally anxious they should. The mistake is made in postponing this interesting task until they are far along in their teens and find it extremely difficult. It isn't hard to learn to swim. In fact, it is surprising what a simple matter it is to keep yourself up in water if you only know how. To learn incorrectly is almost as bad as not knowing at all. To flop about and keep afloat is something, but there is an immense satisfaction as well as pleasure in being perfectly at home in the water and thinking no more of swimming in water a hundred feet deep than if it were only up to your waist. The depth of the water doesn't worry the good swimmer. After having mastered the strokes out of the water and having accustomed yourself to being in the water, then you are ready to strike out, and if you keep your head the stroke will come to you as naturally as walking.

The breast stroke, used in ordinary swimming, is the first one learned. To get this stroke, when standing upright in the water throw yourself forward on your breast, and your feet will rise to the surface of their own accord. It will surprise you to see how long you can lie on top of the water in this way without making a single stroke and with a slight movement one might keep afloat for a long time. Beginners, however, splash and pound about as soon as they feel themselves without any support, and if they essay to make strokes it is usually at more than double quick time.

When lying on the breast ready for the first stroke, the head is thrown back and the chin raised out of the water. The arms are doubled up under the breast, elbows down and palms together. You are then ready for the thrust, which is made straight forward, keeping the hands under the water and the fingers together.

When the arms are stretched to their entire length the palms are turned down and the arms brought around in a semicircular sweep, still horizontal and at right angles to the body. Then when the arms have described this movement the forearm drops down and with the elbow as a centre describes another semicircle, palms vertical, until the hands are again under the chin, when the arms are doubled up under the breast in position for the next stroke. The arm and leg motions ought to be practised separately and then together, for the most difficult part is to master the combination of the two in proper time. This is really the secret of swimming.

A froglike movement best describes this leg action. An excellent way to practise it alone is to hold on to the railing of the tank, and then draw up the feet and kick out. The first position is with the legs out straight, heels together; then the feet are drawn up toward the body, heels still touching, and toes as nearly in a line with the body as it is possible to get them. Then when the knees are bent and the heels touch the body the legs are shot out and down with a quick kick, which sends the body through the water. The speed of the swimmer depends altogether on the strength of the leg movement, and particularly on the force with which the legs are brought together again.

Almost at the same time that the hands are thrust straight out the kick is made; then both arms and legs assume the first position for the next stroke. This is the motion that requires practice, and when you can get these together and at the proper time and keep the body near the surface of the water without making a single ripple, then you may consider that you have attained good form, for you have mastered the most important and the prettiest stroke there is in swimming, the breast stroke. The side stroke is comparatively easy and is used generally to rest the swimmer.

Swimming on the back is perhaps the easiest of all, in the opinion of a writer for the New York Herald, and after you have learned to float and have gained a good breast stroke any of the other postures are easy enough to learn. When, standing in the water, you wish to try swimming on your back, throw the body backward and kick hard with the legs apart; then bring the heels together, the legs still straight. The leg movements are very much the same as for the breast stroke.

Extend the arms straight over the head, with the backs of the hands touching instead of the palms. With a long circular sweep the arms are brought through the water until they reach the side of the legs, palms turned inward. The lungs are kept inflated, and with a powerful leg stroke great speed can be attained. This stroke is especially good for long distance swimming, as it is less tiring.

After you have once learned the breast, side and back strokes, you can devote some of your time to fancy swimming.

KEEPING TRACK OF A RAILWAY'S CARS

SYSTEM INVOLVED IN MEETING THE DEMANDS FOR FREIGHT AND PASSENGER TRANSPORTATION

EVERY public holiday the Boston Transcript is accustomed to receive letters of complaint from its readers because of the inadequate conveniences of travel. Calling up the offices of the railway by telephone to learn the cause of the general indignation the editor was usually informed that every car on the line was in use. Recently, Benjamin Brooks, representing the editor, took it into his head to go deeper into the problem and learn the system of distributing the cars along the line. On his tour of investigation he learned that every railway has a car service department, a department whose special duty it is to know exactly where every car on every branch of the line is today, how many cars on every branch will be needed tomorrow, and to see to getting them there; to keep tally on every mile that every car travels, if it is a borrowed car on their tracks, or a loaned car on someone else's tracks; to know beside that exactly what kind of car it is, box, flat, furniture, special, coal, live stock or passenger; whether it's loaded or empty, in good order or bad; and to be able to answer all manner of questions about it in a minute.

On the Boston & Maine, for example, there are twenty-two hundred and some odd miles of tracks, nine hundred locomotives, fifteen hundred passenger cars and over seventeen hundred freight; each freight car on the average travels four hundred and fifty miles a month, and the passenger coaches go as far sometimes as twice across the continent in that time.

The modus operandi of the car service is this: Each morning bright and early, each yard clerk in each station all over the entire system telegraphs in to the main office in Boston, so many cars on hand, and of what sort, so many loaded, so many empty, so many gone, and so many wanted in. In the main office is a printed sheet some two feet square ruled into columns. Along one edge, names of stations; along the other, names of railroads and kinds of cars; with subdivisions for "loaded," "unloaded," "required" and so on; and as the telegraph instrument ticks off all about it, the clerk runs his finger along the columns, placing a number here and there, till in no time at all he has a graphic representation of the location and condition of everything on the road.

At the same time he hears by telegraph that Farmer X has so many bushel of grain here, and Y., Z. & Co. have so many tons of coal there to be taken somewhere else; or that on a certain morning the Ancient Order of Indescribables will leave town in a body for an outing; or that a silver cup is to be lost or won at golf (with a few thousand people to look on) in the neighborhood of Newton Something-or-other. The car service man is not supposed to take in any of these things, mind you, but simply to provide cars. His duty goes no further. As to how they are to be got there, and on what time schedule, that is the despatcher's business.

Thus much for keeping the supply and demand of cars even, and all the moves going at once over the whole great checkerboard. But a car has its economic side. Every mile that it travels must be counted and recorded and charged to the company on whose tracks it rolls at so many tenths of a cent per mile. To make this possible, the conductor of each freight-train prepares a sheet when his train is made up, recording the number, the type, and the ownership of each separate car and just how far he took it and where it was left. Once a week these records come into Boston, and thirty aspiring lads on thirty long-legged stools (until they have earned their arm chairs and roll-topped desks) sit and transfer them in a more or less hieroglyphic manner into large important-looking books. Thus the joys and sorrows even of the most battered and unassuming freight-car on the line, its accomplishments and misdeeds, its bad half hours of derailment and hot-boxes, from the time it starts from the car shops till it has lived its probable fourteen years (barring smashups) and traveled its probable seventy-five thousand miles, are all set down by these recording angels for future reference; and thirty more men with thirty multiplying machines go over the books and the miles and the cars and find out whether the Boston & Maine owes the Canadian Pacific, or the Canadian Pacific owes the Boston & Maine for car service and how much. And as they work, the telegraphs hum together like busy bees, the orders come in and go out and there is always more for them to do.

In connection also with a car service department are what are called "car tracers." In the days gone by, when the system was not at its present state of perfection, it was the car tracer's business to hunt up lost cars. Strange places he often found himself in. He can tell you stories of cars dumped off trestles and forgotten, cars left in dark mining tunnels long after the mine had ceased to be of human interest, of box cars reposing in the western desert lands made to afford all the comforts of home for "Lo," the poor Indian, together with Mrs. Lo and family; but there is no romance in being a freight car nowadays. In the last ten years, one forlorn car, buried for a few weeks in a snow bank on the Worcester & Nashua branch, is all the Boston & Maine car tracer could boast of having lost. Nowadays he is simply an agent to go about from place to place persuading this man that if he could have so many cars unloaded by sunrise tomorrow it would be but a just accommodation to the road, or that this ship-owner could wait twelve hours as well as not, for this or that, in case of a washout on the line—doing the business of the department, in other words, that the telegraph is not capable of—a sort of lubricating device to insure the smooth running of the machine.

Trying to stick them together.—*Minneapolis Tribune.*

A railroad exists principally because it can count on carrying a certain number of people (more or less) in certain directions and at certain times about three hundred days in the year, and for motives of economy it figures on using nearly all its cars nearly all the time. At the end of each train stands an empty car, which, if the regular number become overcrowded, may be hitched on before starting. This meets most ordinary demands; and on holidays the demand for more cars is met by making more trips with the same ones over again that would under ordinary circumstances lie idle during the middle of the day. Special excursions are usually provided for if they are of any great size by borrowing cars from other roads. When, however, it comes to a real pleasant holiday, when everyone wants to go everywhere at once and nobody could beg, steal or borrow a car from anyone else, no railroad is able to provide cars enough so that everyone shall have a seat.

Continuing, Mr. Brooks says: "My sympathies are entirely with the kicker, and I shall go on applauding him till there is a seat for everyone every day in the year, a place for his suit case and golf sticks, a special department for the accommodation of peanut shell and orange peel, as there is today for tobacco smoke, and a special double-lined, muffled, refrigerated and chloroformed car for squawking infants; only, I have endeavored to show that he is not kicking merely against the accidental mismanagement of a day, or the carelessness of this or that person, but against a sound and well formulated system and a definite principle of economics. Therefore, let him undertake his kicking with his mind firmly made up and his boots securely tied on."

INDIAN LACE MAKERS

INCREDIBLE as it may seem the only lace in which the pure Venetian stitch is used made in the United States for sale is made by Indian girls on our Western plains, and strange it is that these so recent savages should come to learn this "Reticilli" stitch, which has been carefully guarded since the fifteenth century by the deft-fingered laceworkers of Italy.

Miss Sybil Carter, connected with the board of missions of the P. E. church of the United States, who is an enthusiast on the Indian mission question, imbued with the same spirit which prompted Lady Aberdeen, who taught the poor women of her native land lace-making that they might become self-supporting, went to Venice and learned how to do this work. Returning to the United States, Miss Carter personally taught the pillow lace inserting to the Indian girls in the Southwest and instructed young women who were fitting themselves as teachers to the different missions in other branches of the work. It is from this mission that the pieces of the beautiful work which are to be found in New York homes have come. The isaithmah, or sewing women, as the lace makers are called, come from all parts of the reservation to the mission school, which is near the center, and are instructed in this work by Miss Ida Roff, who has been in charge here about four years. Despite the fact that many of them do not understand or speak our language, all learn to do the work well enough for sale. The ability to imitate which is possessed to a high degree by the Indian races is the quality which enables them to become adepts at lace making. There are at present between forty and fifty in the Kiowa country who can do this work well, one of whom, Martha Napawat, has long been a belle of the reservation. Martha is a graduate of the Carlisle Indian School, and reads the best literature of the day as she sets the dainty stitches in centerpiece or teacloth.

FORTUNES IN THE COCOA INDUSTRY

ONE of the most inviting of agricultural pursuits in the Lesser Antilles and in many parts of Venezuela is the cultivation of cocoa. The island of Trinidad produces cocoa of a quality second to none, and only equaled by that grown in the vicinity of Caracas, and which brings the highest price in the London market. Considerable patience is required to grow it from the seedlings, as it takes five or six years of cultivation before there is a harvest worth mentioning, and seven or eight years before a full crop can be realized, but when the trees are once full grown they will continue to bear fruit for an almost indefinite time.

The cocoa tree seems to flourish best in the rich and well-watered soil along the banks of the many ravines that traverse the uplands of the island, where they are more or less protected from the violent storms. The cocoa tree must always be protected from the powerful rays of the tropical sun, that seems to blast the fruit. When young, they are shaded by growing bananas or plantains adjacent to the young tree; these grow very rapidly and furnish the required protection, as well as a source of some profit, while the cocoa is too small to bear. But it is necessary to provide for a future shade—for the cocoa after three or four years outgrows the banana—and for this purpose a tree known as the "Bois Immortel" (sometimes called the "Mother of the Cocoa") is planted at the same time as the cocoa tree; this is a tall tree with high and spreading branches that form a sort of canopy over the entire cocoa plantation and give it the required shade, making it resemble an open forest. The coffee tree, which is much smaller than the cocoa, is often grown in small quantities among the cocoa.

The cultivation of cocoa consists largely of draining the land, keeping down the undergrowth of bush and weeds, and trimming the trees. The flowers occur in clusters on the main branches and on the trunk of the trees, usually only one of each cluster reaching maturity. The fruit is a hard pod six or seven inches long, resembling a cucumber, growing from the trunk or large branches, and looks very much as though it were artificially attached. Buds, blossoms and fruit, in all stages, occur side by side, and ripened fruit is harvested at all times of the year. The main crop, however, matures in the dry season and is usually harvested in February; only small quantities ripening during the remainder of the year.

The pods each contain five rows of seeds or beans, quite similar to a large, thick Lima bean, embedded in a pink, acid pulp. These seeds are the cocoa beans of commerce. The harvesting consists of cutting off the mature pods by means of a knife on a long bamboo pole, gathering them into heaps on the ground, where they are allowed to lie for about twenty-four hours. They are then cut open with a cutlass, the seeds and pulp coming out in a mass; these are carried to the dry-house. As soon as the beans reach the dry-house, they are placed in the "sweat-box" or pit, where they are closed up tight and allowed to ferment for some time. This process requires very careful attention to prevent the temperature from getting too high and to stop the fermentation at the proper time to insure the proper flavor, as well as the fitness for the preservation of the beans.

The next process is the drying, which is accomplished by spreading the beans in a layer over the platform and drying them in the sun. Each morning, during the early stages of the drying process, the beans are gathered into a heap in the middle of the floor and given a thorough mixing. This is sometimes accomplished by the laborers mixing and kneading them by treading them with their bare feet.

This is known as "dancing the cocoa" and renders the beans smooth and uniform in color. The dried beans, when ready for market, are put in canvas bags holding about 150 pounds, and the name of the plantation stenciled on the bags, these names or brands at times becoming very prominent in the market for the quality of cocoa the plantation is reputed to produce.

The manufacturing, says a writer in the Scientific American, is invariably done in northern factories and consists of roasting the beans in a revolving cylinder. This develops the aroma and fits them for crushing. After the beans are crushed they are screened to separate the "nibs" or crushed nuts from the shells. The nibs are then ground to a fine meal; this is put in sacks and put in a powerful press, where it is subjected to heat and pressure, and the fat, known as "cocoa butter," is squeezed out, and the hard substance left in the sack has only to be broken or powdered to become the pure chocolate, and this more or less adulterated is the chocolate of commerce.

MAKING VENEERED DIAMONDS

EVERY one is aware that when real diamonds are cut a quantity of fine dust is given off which is apparently valueless. But lapidaries collect the sweepings from the tables and sell them at $20.00 per pound to the makers of artificial gems, who purify them with acid that destroys everything but the pure diamond dust. This is mixed with another acid and placed under enormous pressure, which results in sheets of diamond dust as thin as paper being given off.

The facets of the sham stone are then covered with transparent cement and a layer of diamond paper laid upon them. When dry, the false jewels, veneered with the real dust, are so similar to the genuine stones that they are often set in pure gold, for no one but an expert can detect the difference and then only with the aid of a powerful magnifying glass. This is, of course, the most expensive artificial gem made, inasmuch as one that has been properly veneered cannot be purchased for less than $2.50.

Thus it will be seen that no small amount of skill is required to make imitation stones, and the workmen in the cutting, polishing and facing-up departments can command high wages. In the first-named, $12.50 to $25.00 per week is the average salary, while those who undertake the delicate task of veneering are by no means too highly remunerated at the rate of from $15.00 to $30.00 per week.. The London Tit-bits says that no metal work is done at the factories where these stones are made, the setting being left to other firms, who receive the gems in cases holding from 100 to 500 each. Large quantities of them are used for theatrical purposes.

RELIGION, PHILANTHROPY AND REFORM

A TAX ON POSTERS

FRANCE has led the way and placed a tax on placards and street advertisements on a thoroughly organized basis. Each printed poster is required to have a stamp affixed, varying in value from one cent for the smallest to four cents for the largest. These stamps must be affixed to all bills posted on walls or in public places, even though they be written by hand. Failure to comply with the law renders the author, the printer, and the billposter alike liable to fines. In the case of painted street advertisements the tax is levied in the form of a license fee, which must be paid before the sign can be painted. The fee varies according to the number of square yards in the poster, and also according to the size of the town, being 20 cents a square yard in small towns and 50 cents in Paris. Failure to pay this tax involves a heavy fine. There is no tax on ordinary signs in front of stores.

This system of taxing posters has been in use in France since the days of the last empire, and has proved to be a reliable source of revenue. The average income of the government from poster stamps is about $690,000 a year, while that from painted street advertisements is $200,000, making a total of $710,000.

Aside from the revenue the greatest value of such a national law is in the power given the government to control and prevent the appearance of flaring and immoral advertising matter. Such a system could be introduced into the United States with the greatest profit.

FUND FOR DISABLED FEMALE TEACHERS

A STEP worthy of philanthropic emulation is the bequest of the late Lewis Elkin, a prominent merchant of Philadelphia, to constitute a pension fund for the relief of disabled female school teachers in the employ of the city of Philadelphia.

Any unmarried woman teacher who has taught in the public schools for a period of twenty-five years, and has no other means of support, is entitled, when certification is given by the president and secretary of the board of education, to an annuity of $400.

This munificent bequest of Lewis Elkin may be classed as among the most notable and worthy philanthropic acts recorded within recent years. Neither the state nor the city makes any provision for school teachers when age and infirmities prevent them from continuing longer in their profession. The salaries paid them are, as a rule, so meagre that it is almost impossible for any considerable amount to be laid away against that time. As a rule, in their younger years, at least, the women teachers have others dependent on them, and so, when their days of work are finally over, many find themselves penniless. To these, the fund created by Lewis Elkin will be more than a relief from anxiety as to the future.

The Public Ledger of Philadelphia adds the information that the donor was for many years a school controller, and in that time he came to know and appreciate the worth of the women teachers in the public schools. His benefaction is thus as much in the nature of a gift in recognition of services performed as it is a charity.

WORK AMONG THE EX-PRISONERS

IN a recent address in Baltimore Mrs. Ballington Booth, the "Little Mother" of the Volunteers of America, gave some interesting details of the work in which she is particularly interested in the prisons of the country. In the five years since the movement was started permanent organizations have been established within twelve States' prisons and two homes have been opened, one in New York and the other in Chicago, for ex-prisoners—the word ex-convict, she said, was obnoxious to her, branding a man for ever. Between 1,600 and 1,700 men, she said, have passed through those homes, and of that number she is in touch with 75 per cent. and knows that they are leading honest, respectable lives. Of the remaining 25 per cent. only 5 per cent., to her knowledge, have gone back to prison, the other 20 per cent. not having been heard from. "By those who have had experience in work of this sort," she said, "this is recognized as a good record, especially as we make no distinction between the different classes of prisoners. We don't say we will help only first-term men; we help any who show any desire to be helped." One of the most encouraging features of the work reported was the decrease of prejudice in many quarters against the employment of ex-prisoners. One instance was given of a man who had as a personal favor to Mrs. Booth employed one of her boys, and who has gradually increased the number in his employ until now it is thirty-five.

TO PREVENT ALCHOLISM

IN discussing the best means of preventing alcoholism at the recent Anti-Alcohol Congress at Vienna, Dr. Burtscher of Bern laid great stress on the importance of an abundant, inexpensive food-supply for the poorer classes. He stated that the consumption of liquors is most prevalent and the effect worst among the most poorly nourished peoples of Europe. The excessive use of alcohol is not so frequently the cause of poorly developed and nourished bodies as is imperfect nourishment the cause of an abnormal craving for liquors. The effects of alcohol are also decidedly worse among the badly nourished. Drunkenness, delirium-tremens, and mental diseases are uncommon among the well-nourished peoples of Germany as compared with the condition among the badly nourished Poles and Irish. Temperance societies, tracts, cures, and institutions for the treatment of drunkenness will all prove of little avail as long as the poor are unable to obtain food to nourish themselves sufficiently well to prevent abnormal craving for stimulants.

BUILDING PORTABLE CHURCHES

HERE are portable churches, as well as schoolhouses, and the Reformed Church in Pennsylvania is thinking seriously of adopting them for congregations not yet financially able to erect permanent buildings. These movable churches are made of corrugated galvanized iron, fastened to a wooden framework, which framework is covered on the inside with a wainscotting, lining the whole side and ceiling. Between the iron and these "match-boards" is a space of four inches, which keeps out dampness; the sides and roof are lined with a heavy felt which gives warmth in winter and protection from heat in the summer. The churches can be made any size and on any plan. Each piece is so marked and the whole is so planned that any ordinary mechanic can readily put it together. One seating 300 persons can be put up ready for use at a cost of $1,500. It is neat and attractive. Moreover, it is lasting. If painted every four years in our climate it will be good for forty years. Being movable, it can be shifted at any time when another location seems desirable.

THE LORD'S PRAYER ON A CLAY TABLET

A COPY of the Lord's prayer has been found written upon a clay tablet in uncial Greek letters. It dates possibly from the second century, and certainly no later than the fourth century.

It was discovered at Megara by a boy and purchased from him for a trifle for the museum at Athens, where it is now carefully preserved as a unique Christian document.

The fragment discovered at Megara is only four and one-half inches high, four inches wide and two-thirds of an inch thick. It is reddish brown in color and it is evident that the Greek characters were engraved upon the clay while still soft and that then the tablet was baked to give it permanence.

The only marked difference between the text of the prayer as found here on the tablet and that of Matthew is in the omission of the doxology at the end. That the words "for thine is the kingdom and the power and the glory, for ever, Amen," found in Matthew are an interpolation is generally accepted by Biblical scholars, so the omission of this sentence from the clay tablet speaks volumes for the early date of its production and the originality of its source.

The use of this clay tablet with the "Lord's Prayer" upon it is not certain, but it is suggested that it was hung up in a private house.

The importance of the discovery lies in the fact that as early as the third or fourth century, or possibly the second century, Christianity was so popular in Greece that one of the followers of the faith had the Lord's prayer engraved upon a tablet and hung it on the wall of his home as a guardian against all evil.

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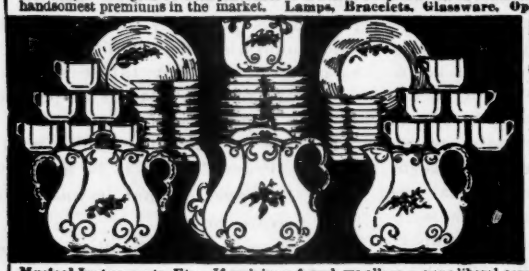

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EDUCATIONAL PROBLEMS OF OUR DAY

REACTION AGAINST THE KINDERGARDEN

THE editor of the New York Post has been taking up the subject of the kindergarten, pro and con. He uses as his text the remark of a New York school-teacher, who said:

"I positively dread to have kindergarten children come into my class. In most instances they are disorderly and flighty."

After calling attention to the danger of going to extremes the editor shows that in one respect kindergarten methods have undeniably proved weak. The notion has been to make the work so attractive that children shall regard their tasks as mere play. In carrying out this plan there has been too great an effort to provide endless amusement, to avoid anything which resembles application to a disagreeable task. The result has been that kindergarten children have passed into primary, grammar, and high-school grades, still insisting that the class-room shall be a place for pure entertainment, shirking such dry and unpicturesque details as the multiplication table and the rules for the accusative case, and rebelling against any old-fashioned teacher who clings to the obsolescent but wholesome discipline of occasionally driving a class hard.

What remains when the kindergarten is striped of fictitious and fantastic elements? For one thing, the very idea of arousing the pupil's interest, of rendering the lesson amusing, when the idea is not abused, has been of great value in modern education.

Another important contribution is the development of the power of observation through the early training of eye and hand; for the lessons in drawing, in paper-cutting, in nature study, have a genuine value, which is not to be despised, however much the exaggerated praise of special pleaders may cast discredit on it. The development in the young child of the ability to observe with care and copy accurately has a beneficial effect on all the later processes of education, especially in an age when increasing stress is laid upon scientific training and the so-called laboratory method.

The best feature of all, perhaps, is the discipline which children acquire from being early subjected to regular stated tasks and to reasonable rules for behavior both toward teachers and classmates. Many an ill-governed and unruly urchin has been made a tolerable member of the family or of the infant commonwealth of the streets through the influence of the kindergarten. Other children who, if left to their own whims and devices till they had reached the ordinary school age of six or seven, would have become absolutely incorrigible little loafers, truants, or even thieves, have been rescued by being taken into the kindergarten before their characters had received the wrong set.

The kindergarten will be especially serviceable to those children who, for one reason or another, are not likely to learn the lessons of juvenile citizenship through early contact with playmates; that is, to children who at home have few or no playmates. The kindergarten may also save those children who, for one reason or another, are not early brought under steady and intelligent discipline, the neglected children of the very poor and the very rich.

BOSTON'S SCHOOL GARDEN

BOSTON is leading the way in a new venture, if we may believe the extended report in the New York Herald. Children from the public schools are being taught kitchen gardening, and the movement bids fair to spread to other districts and to other cities.

The idea of a garden school originated with Miss Dora Williams, teacher of science at the Girls' Normal School, and Miss Annie Willington, of the South End House, a college settlement institution. They secured the use of a square piece of land containing about one thousand square feet, almost in the heart of the city. The property belongs to the School Board.

The garden school project was talked over with the masters of the Rice Grammar School for Boys and the Franklin School for Girls, both located near by, and a class of forty-five boys and a class of forty girls, each averaging about thirteen years of age, were chosen to work the garden.

At the beginning of the movement toward a garden school City Forester Doogue was interested, and volunteered the services of a husky gardener to help in the heavy manual work.

At the very first intimation that seeds would be needed, many firms dealing in seeds and fertilizers made generous contributions from their stock.

The class of boys was taken first to the garden and shown about mixing soils and fertilizers. After they had completed this part of the work and had laid the ground out in small gardens about 3x10 feet each, the class of girls were initiated into the attractions of gardening. Each pupil was made sole temporary owner of a garden and allowed to select what he or she would plant.

PROGRESS IN DISCOVERY, SCIENCE and INVENTION

TALKING THROUGH THE SEA

IMPOSSIBLE though it may seem, recent inventions allow ships to talk intelligently to one another through the sea a distance of twelve miles. A ship can now be fitted out not only with a voice that will carry twelve miles under the water but also with a pair of ears which will hear and automatically announce messages from the shore or from other ships.

The inventor of this marvelous system of sea-signalling is Arthur J. Mundy, of Boston, Mass. A great deal of credit is also due to the late Prof. Elisha Gray, of Chicago, who perfected the electrical part of the apparatus.

Signals are made by means of a large bell sunk under the water and rung by a hammer that is connected with an electric wire. The wire runs from the bell to a sort of typewriter keyboard, so that a variety of strokes may be given by the operator. The sound of the bell-strokes may be heard by a sailor in the hold of a vessel over a mile distant. By the submersion of a common ear-trumpet fastened to a six-foot length of gaspipe the sound can be heard at a distance of three miles. For greater distances Prof. Gray devised an electrical receiver and annunciator, by means of which a bell twelve miles away can not only be heard but echoed on a large gong in the pilot-house.

The submerged part of this receiver is shaped like a gigantic ear and will automatically hear and announce the approach of other vessels. Even the clicking of the machinery of a small tugboat five miles distant will be repeated on the pilot's gong.

No invention since the building of iron steamships has been of so much interest as this to those who travel on the sea. The terrible fog, which causes 300 wrecks a year on the English coast alone, has lost its dangers to a vessel equipped with long-distance ears of this self-operating kind. The loss of the steamship City of Rio de Janeiro, which went ashore in a fog on the California coast, would have been prevented if one of Mr. Mundy's signal bells had been within twelve miles. A loss of 128 lives and over a million dollars' worth of property would thus have been saved.

The New York World says that Mr. Mundy has exhibited his invention to Admiral Higginson, chief of the National Lighthouse Board, and to Admiral Bradford, of the Navy Department. These officials have watched the experiment with great interest and are considering the adoption of the device on board American warships and along the coast-line. The inventor has made a proposition to the Government that a signal-bell be placed at every ten miles off the coast, every bell to ring a different signal and to be marked on the chart.

By this means, in fog or darkness, every ship within twelve miles of the coast could at once tell its location. Prof. Gray, just before his death, patented an improvement on the receiver, by means of which the pilot can tell exactly from what direction the signal-bell is ringing.

The idea of submarine signalling first occurred to Mr. Mundy in 1898. While spending his vacation on the Mississippi river he noticed the continual stoppages that the steamer was obliged to make merely to obtain a short message or order from some one on shore. Why not signal under water? He remembered how, when a boy, he had struck two stones together under water to deafen the other boys who were diving. Then he made experiments with a bell and was so successful that he obtained the assistance of Prof. Gray, who was perhaps the best authority in America on practical acoustics.

For eighteen months they experimented at Mr. Mundy's home in Cape Ann. Mass., and finally perfected the present system of signal-bell and receiver.

TRANSFORMING SMOKE into LIGHT

AN engineer named Tobiansky, of Brussels, Belgium, has invented a process by which smoke can be transformed into the most brilliant light.

In operating his device the smoke from any kind of fire is forced into a pipe containing gas, thus greatly increasing the brightness of the flame.

This discovery is easy to comprehend when it is remembered that the white light of the gas flame is caused not by the consumption of the gas but by the luminosity of the carbon.

Thus the blue flame of a gas stove, resulting from perfect combustion, gives off less light than a tiny gas jet, in which the tiny stones of carbon are not at once consumed. Heat and light are produced by quite different processes, and Tobiansky's discovery is a plan by which the light can be increased without adding to the heat.

Smoke is practically nothing but particles of unburned carbon. Therefore, to combine smoke with gas is to greatly increase the number of shining particles of carbon in the flame.

This discovery is entirely new to the scientific world, and the experiment has not yet been performed in this country. It is regarded as of great commercial value by the few scientific men in Brussels who have witnessed the experiments made by Tobiansky.

A MOUNTAIN OF GLASS

A PARTY of archeologists and antiquarians have made important discoveries in the hitherto unexplored region at the northern limit of the Harqua Hala range of mountains in Arizona. A great desert and the total absence of water have prevented any previous examination, and only the Indians know of the curiosities of these mountains. One side of one mountain rises in terraces and presents many features recalling the Grand canyon of Colorado. The whole mass is of obsidian or volcanic glass and glitters in colors of green, blue and black. It may be seen on clear mornings at great distances, and the glitter of the mountain has lured many travelers in its direction.

The exploring party found under a high shelving rock a narrow-necked olla, or earthenware jar, bottom up, containing human bones, a broken hammer and a metate or stone employed by the prehistoric races of Arizona probably for the same purposes as a similar utensil is used by the aborigines of today for grinding maize. Slabs, turquoise stones and other curiosities were revealed by digging, and there were marks on buried rocks which were supposed to be inscriptions.

A careful study of the curiosities was not made, but another party will be organized for the purpose of unearthing all available relics in the mountain and studying them. The Salt Lake Herald says that the mountain of glass is a marvel of volcanic upheaval. It is pretty much as the last eruption left it, except that where fractures have occurred the varied and beautiful colors of the volcanic glass are brilliantly reflected. The mountain is dangerous and difficult of ascent, owing to the precipitous terrace and the ice-like smoothness of the surface.

DOMESTICATING THE ZEBRA

THE discovery of a new species of zebra somewhere on the borders of the Congo forest in Africa has called fresh attention to this interesting animal. This new species is apparently a quagga with the stripes reversed; that is, instead of being striped on the head and shoulders, it is said to have a tawny head and back, and a striped belly and legs. The latest news as to zebras generally is the discovery of astonishing herds of them on the plains that lie south of Albert Nyanza, Albert Edward Nyanza and the plateaux between the great lakes generally. They are said to be seen feeding like ponies in a field, and have almost no fear of man, as many of the tribes which inhabit the district are only vegetable feeders, and do not even dig pitfalls for the abounding game. According to the London Spectator, it is this abundance of the natural wild horse of the district which has prompted Mr. R. Stordy, M. R. C. V. S. to write a detailed recommendation to the foreign office suggesting the domestication of the animals for draught purposes in the fly country and central Africa generally. He believes that the wild zebras could easily be taken up in kraals, and the foals regularly broken and used for domestic purposes. From these a tame race might be bred, just as tame ostriches are now perpetuated from a stock which fifty years ago was wild on the African deserts.

Neither the idea nor the fact of taming zebras is new. In the middle of the last century half-broken Burchell's zebras were sometimes seen for sale in Cape Town, with a rider mounted to show that they were rideable. It is said that they were exported to the Mauritius for draught purposes. If so, it would be interesting to know from the records

of the colony whether they were a success, and whether they were bred there. The females are fairly prolific even in confinement, and the males cross freely with horse mares as well. It is possible that they may have been in Mauritius for some time, as camels were in Jamaica in the very early days of the plantation. The experiment has been tried with complete success in England and in South Africa. Mr. Walter Rothschild's team, three zebras and a pony, was fairly well broken, though perhaps the animals were not all that could be desired in the stable. At Barnum's show a team of four zebra mares was as quiet as so many sheep. In the Field of March 11, 1893, appeared a photograph of a team regularly driven in the Transvaal.

TRIUMPH AS AN AERONAUT

AERIAL navigation has been put on a practical footing by the recent successful experiments of M. Santos-Dumont, the Brazilian inventor. M. Santos-Dumont has been experimenting for five years in aeronautics, though he is now but 28 years old. His recent achievement of circling three times around the Eiffel Tower, proves the possibility of a dirigible balloon.

Nearly all of M. Santos-Dumont's ascensions have been made from the grounds of M. Lachambre's factory, in Rue Vangirard, in Paris, where Andre's balloon and many others were constructed. In 1898 he made thirty-seven ascensions, and on one occasion he remained above the clouds for twenty-three hours —the longest period on record. Many other flights have been taken from the Jardin d'Acclimatation.

A self-reliant mechanician, it was his observation of the motor used for driving tricycles that induced him to employ it in the propulsion of a gas balloon. His balloons are cigar-shaped, with a volume of 500 metres. The petroleum motor revolves a screw at the stern, capable of from 1,200 to 1,500 revolutions a minute. This reserves all the power for changing the direction of the airship, no matter what the direction of the aerial currents. For the uplifting of the balloon itself common illuminating gas is used, and M. Santos-Dumont is the third aeronaut to have a fire in the balloon, with the escape tubes far removed from the basket and the engine.

Speaking of his experiments and his success in speeding on, regardless of the defection of the wind, M. Santos-Dumont said, according to the New York Herald:

"My idea was to work on the principle of aeroplanes. The propeller sends the balloon along at the rate of 20 miles an hour, just as a steamer is forced through the water. To cause the airship to rise or fall, I bring weights into requisition. At each end I attach ropes, to the extremities of which is fastened 50 pounds of ballast. These ropes are controlled by a system of guy ropes.

"If I wish to get to higher strata, I throw out the ropes at the stern of the balloon. When it reaches its limit the 50 pounds of ballast draws down the stern of the balloon, and the bow, of course, is pointing upward. Then the propeller is sent ahead at full speed, and the balloon shoots up toward the sky. When I desire to descend I pull in the stern ballast and throw out that at the forward end, which deflects the bow, and down I shoot."

It was on November 13, 1899, that M. Santos-Dumont first demonstrated his ability to steer his balloon in the upper air, and so complete was his success that speculators who had been skeptical were convinced. He went up at Vangirard, and his first flight was toward the Eiffel Tower. Without the slightest apparent difficulty he encircled it, and, though the wind was from the southwest, he went off toward the west.

He descended near the Moulin, at Bagatelle, in the Bois de Boulogne, and then it was learned that previously he had arranged with many of his friends to land at that place. Indeed, so confident was he that he made a heavy wager that on one ascension he would come down on the roof garden of the Automobile Club, in the Place de la Concorde.

FISH HAVE SEVEN SENSES

MATTHIAS DUNN, the Cornish naturalist, after life-long study of fishes, declares that they possess not only the five senses belonging to man, but two additional ones, without which even man, although he were equipped otherwise for life in the deep sea, could not undertake those mysterious migrations which many kinds of fishes annually accomplish as a necessary part of their life plan, and which they would still accomplish if they were indeed bereft of sight, hearing, feeling, smell or touch.

"Fish have the homing instinct as well as man," says Dr. Dunn, "and have their summer and winter homes, often far apart. If man had no better mental activities or senses than he now has the worry consequent on following these weak sensations would be a thousand times more perplexing in the sea than on land, and the intricacies and difficulties and obstacles of the sea depths would make the neighborhood of the home at times a most embarrassing place to find." But the migrating fish goes to it as unswervingly as the needle pointing to the pole; and it is virtually a needle pointing to the pole that forms the one sense which Dr. Dunn declares enables the fish to locate its destination and proceed onward to it with steadiness and persistency. This sense Dr. Dunn calls the magnetic dermal sense, as distinguished from its other alleged additional sense, the electric dermal.

The brain of the fish, he says, is a magnet, polarized by the influences of the peculiar structure of the lateral line, and acts in response to the magnetism put forward by the rocks or sands at or about the destined point of the fish's migration. Thus this magnetic dermal sense, the creature of natural laws and not instinct, guides the fish on its journey as the needle guides the mariner on his course above the fish, with this added security and infallibility of guidance, that the fish could not disregard its compass if it would. But fewer of te fishes would arrive at their destination, according to Dr. Dunn, if it were not for that companion sense, the electric dermal, which invariably warns them of destructive elemental disturbances.

Dr. Dunn says that the hearing of fishes is acute, and cites a remarkable instance in proof of it—the firing of the 9 o'clock citadel gun at Plymouth, "when the excitement in the sea is intense, for all the surface-feeding fishes along the coast for miles will instantly rush out of or along the water, making a din to be remembered." It is the custom of the fishermen off Cornwall, when the fish load the nets and gather in a mass in the bag of a net, making its lifting impossible, to stamp noisily on the hatches. The clatter so frightens the fish that they instantly scatter to all parts of the net and it can be raised—evidence that the disturbance was heard by them and that it frightened them to flight. "Mackerel," Dr. Dunn says, "are attracted by the sense of smell to the olive seaweed, and the oily odor thrown off by the fatty larval fishes."

He declares that the sense of taste is well defined, as is shown by the fact of their choosing some foods and rejecting others. Few fishes, except the eels and catfish, will accept tainted food and many kinds will take fresh dead food in their mouths but gingerly at first, and will eject it sometimes twice or thrice, the action of their mouths after each ejectment seeming to indicate that they are testing the taste of it before deciding whether it will be agreeable to them. Live food, however, is never taken with this hesitancy, but is seized with a rush and a swoop, for the fish knows it is fresh and will taste good.

On the quality of vision in fishes Dr. Dunn is particularly interesting. He says the sight is not strong enough in adult fishes to discover food or foes or friends, or anything else, at any great distance. Their eyes are not telescopic like those of the higher order of vertebrata, but microscopic, and only useful for the immediate wants and pleasures of life. The eyes of some fishes—flounders, grey mullet, pollock and similar varieties—are microscopic to such a degree that to discover the minute animalculae and crustacea they were feeding on Dr. Dunn was obliged to use the full power of a half-inch glass.

The focus of fish vision extends with age. In mackerel, salmon and other surface-feeding fishes, vision is better than in others. "Some are so keen-sighted," says Dr. Dunn, "as to discover the reflected sheen on a new gut, and to refuse the bait as a consequence or to show pleasure in taking a gaudy fly when the appetite is delicate."

The lips and curious feeling appendages of that class of fishes are their nerve centres.

It is said to be only a question of time before the Bermuda Islands will sink under the ocean. The geological theory is that the islands are merely the remnant of one large island. The subsidence within a comparatively recent period has been from 80 to 100 feet.

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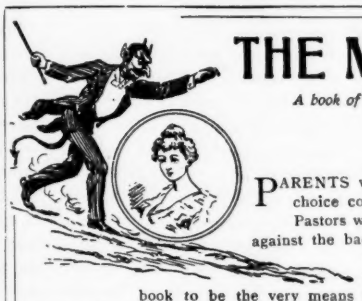

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NEGRO COLONIES IN THE SOUTH

A MOVEMENT is on foot among the colored people of Atlanta, Ga., to establish a colony of their own race, in which no white people may participate or intrude. They have selected a tract of 4,000 acres of land, about seven miles from that city, upon which they hope to place 500 or more families, to be incorporated into an association and to be governed by a board of trustees. There is a good deal of doubt about the practicability of the project, although a similar colony, called Mound Bayou, in the Yazoo delta of the Mississippi river, has been reasonably successful. The Chicago Record-Herald thinks the result will depend largely upon its management. If the projectors can get a clear-headed, cool-tempered, energetic man of executive ability, like Booker Washington or Isaac T. Montgomery, who has managed the Mississippi colony, they will get on all right, but leadership is everything. Montgomery is a remarkable man, as remarkable in some respects as Booker Washington. He was once a slave of Jefferson Davis, is self-educated, and has strong natural abilities. He commands the respect of everybody, and unlimited confidence, both in his integrity and abil ty.

The land for Montgomery's colony was furnished by the Illinois Central railroad, and the town of Mound Bayou was laid out in 1888. About thirty families settled there, clearing seventy-five acres and building cabins for themselves the first year. In the meantime they supported themselves by cutting railroad ties, barrel staves and stave bolts until the first crop was ready to harvest. The first patch of corn planted was eaten by the bears and raccoons; deer were plentiful, and became a nuisance because they acquired an appetite for the tender shoots of sugar cane. Wolves, wildcats and panthers were also neighborly, and the opportunities for shooting wild game would have been enjoyed by the vice-president.

Notwithstanding all these difficulties, the people prospered; the town grew, and there are now about 1,500 settlers, with 15,000 acres of land under cultivation in corn, cotton, sugar and garden truck. The original log huts have been replaced by neat and comfortable dwelling houses. The railway station is one of the best on the line, and has furnished an architectural model to be imitated by the citizens. There are five general supply stores, which are said to be prosperous, and the community has thus far been without the experience of crime. There are no police, except the regular town constable, and the arrests thus far have been confined to petty thieves. The people pay their taxes promptly, every family in town is self-supporting, new settlers are coming in gradually and the area of cultivated land is increasing.

THE OLDEST UNIVERSITIES

THE University of Glasgow celebrated the 450th anniversary of its foundation this summer. The festival may rank with the celebration of the 500th anniversity of the University of Heidelberg in 1886 and the 1,000th anniversary of the University of Bologna a year later, and with the similar functions at Dublin, Halle, St. Petersburg—not to speak of Harvard's 250th anniversary in 1886. Yale's bicentennial, the reader will remember, is close at hand.

The University of Glasgow was established a year or two after the invention of the art of printing, and a couple of years before the capture of Constantinople by the Turks, in a century of great mental activity. It was not at once provided with an endowment. As one of the historians has said, "it came into the world as naked as any individual," but speedily students were gathered, and within three or four years arrangements had to be made for their housing.

The chief growth of the university was in the nineteenth century, although Adam Smith, Adam Reid, and William Hunter brought fame to it in the previous century. In 1800 the students numbered about 600; now they number 2,033—1,692 being men and 341 women. Of the men, 662 are in Arts, 600 in Medicine, 196 in Law, 161 in Science, 41 in Theology. Of the women, in Queen Margaret College, 271 are in Arts, 62 in Medicine, 6 in Science, 2 in Arts and Medicine.

Of all foreign countries, the United States was most largely represented, twenty-eight institutions having delegates. Not many German scholars were present, since the festival fell in the middle of the academic semester; but France sent an imposing delegation. Lord Kelvin was clearly the one whom all most delighted to honor. Not to speak of his position in the world of science, his relation to the University of Glasgow is unparalleled; he was admitted to the University in 1834, when he was only in the eleventh year of his age, he served as professor from 1846 to 1899, and now is enrolled as a Research Fellow of the University.

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PROFIT-SHARING AT BOURNE MILLS

SOME months ago Our Day contained an extended article by the treasurer of the Bourne Mills at Fall River, concerning their profit-sharing plan. It will therefore be of interest to learn from a special correspondent of the Boston Transcript that the corporation has just paid its twenty-fourth consecutive semi-annual profit-sharing dividend. It amounted to three per cent. of the wages earned in the past six months, the previous dividend having been paid the day before Christmas, 1900. This payment marks the end of the twelfth year of the trial of this experiment, and while the rate is a half of one per cent. lower than the last previous one, it is called a very good payment in view of the hard time the mills had in the first period of the year.

The Bourne Mills have not been closed by any curtailment agreement, so that the rate is based on a full wage. In the twelve years it is significant that the corporation has not passed a dividend, and hence the employes have enjoyed regular dividends. In that time the help have kept the agreement they made at the time the system was adopted; that is, the exercise of care in the work, no indulgence in strikes without a complete understanding with the management as to the grievances complained of, if there were to be any, and the acceptance of the terms of the agreement at the beginning of every six months of the trial. In the time the mills have been trying the profit-sharing plan they have doubled their capacity, and now have about 80,000 spindles. The most significant thing is that in the past two or three years the mills have adopted the Northrup looms as a part of the equipment, and while this radical change in the character of the labor to be performed has been going on, there have been no serious frictions between the management and the employes. It is a fact, too, that on this corporation's pay roll are included some of the most active trade unionists in the city and some of the most thrifty operatives known to the local manufacturers who are connected with the banks. The dividend amounts for each participant to about three-fifths of a full week's wage, and it is paid in cash.

GROWTH OF CITIES

THE shifting of population from the farm to the city is steadily increasing. In a late bulletin issued by the census office it is shown that 28,411,698 people in the United States live in cities and towns of over 4,000 population. This is 37.3 per cent. of the entire population, a gain of almost 5 per cent. since the census of 1890, when the percentage was 32.9. Compared with the returns of 1880 the report shows a gain in the urban population of the country of more than a third in percentage and of considerably more than double in actual numbers.

There were in 1880, 580 places of more than 4,000 persons each, with an aggregate population of 12,936,110, or 25.8 per cent. of the then population.

About one-half of the urban population of 1900 was contained in cities of over 100,000 persons. There were thirty-eight of those cities, with a combined population of 14,208,347. There are now 1,158 places of over 4,000 people in the country, as against 869 in 1890.

THE AMERICAN APPLE CROP

THE statement made in the Independent that the value of the apple crop in this country is greater than that of its wheat production will bring a surprise to many. Thus it is stated that the total yield of apples in 1900 was 215,000,000 barrels. Supposing that an average price of $2 a barrel was obtained, the aggregate value of the crop was $430,000,000. The average value of wheat is but a little over $300,000,000 annually. By this estimate the apple crop is worth about 50 per cent. more than our wheat. The export of apples exceeds 4,000,000 barrels a year and it is increasing. The price abroad ranges from $2 to $4 a barrel, the most of the fruit bringing nearer the larger price. Its production extends over a wide extent of country, though few sections of it make the apple their chief reliance for support.

WOMEN AS INSURANCE RISKS

A FEW years ago no woman could take out an accident policy which would allow her an indemnity if she were injured. She could only provide for her heirs in case she was killed, but not for herself, as it was assumed that her time was not worth anything if she were rendered unable to work. This rule still holds with many companies, but others issue accident policies for women exactly as for men, and women should not patronize any that refuse to do this.

Until a comparatively recent date insurance companies considered women as extra hazardous risks, some refusing to insure them and others charging a higher premium than for men. But they kept on investigating and keeping the records and having their physicians look into the question, with the result that many of them have veered around to the point where they declare women to be preferable to the men for purposes of insurance. The dangers incident to child-bearing they consider as more than offset in the men by the worry and strain of business and the results of alcoholic excesses and other dissipations. They have also concluded that women are more likely than men to give a truthful answer to vital questions.

SERVANT GIRLS FORM UNIONS

THE suggestions made by Charles M. Sheldon in the story published in the Christian Endeavor World is rapidly bearing fruit, but not exactly in the manner advocated by him. The latest attempts are more in line with the aims of the Federation of Labor and in fact some of the organizations are directly in league with this. At Wilkes-Barre, Pa., one union of house-workers has been organized, another exists in Cincinnati, but by far the most significant movement in this direction has just been inaugurated in Chicago. There the invitation to organize has come from women already formed in similar unions—the women from factories and shops—and the movement when established will really be in affiliation with the labor federations of the country. It is estimated that 50,000 girls are eligible to this organization, and the auspices under which it is started make it seem possible that pretty nearly this number may be enrolled before many months have passed. Miss Ellen Lindstrom is the woman delegate and the first one in the country. "We do not desire an increase of wages," said Miss Lindstrom in an interview. "Owing to the scarcity of help wages are now high enough. The reason for the scarcity is that the servants do not have enough freedom. By gaining more freedom for the girls we expect to attract many employes from factories and stores who are now driven away from household employment owing to long hours."

The Wilkes-Barre and Cincinnati societies are individual and local, and their regulations deal as much with the betterment of the service from the employers' point of view as from the girls' side. From the beginning the demands of the Chicago union are more radical, as well as more imperative. The working day of the household woman servant is to be eight hours, and overtime, on that basis, is to have extra compensation. No member of the union is to be permitted to work for a lower wage than three dollars a week.